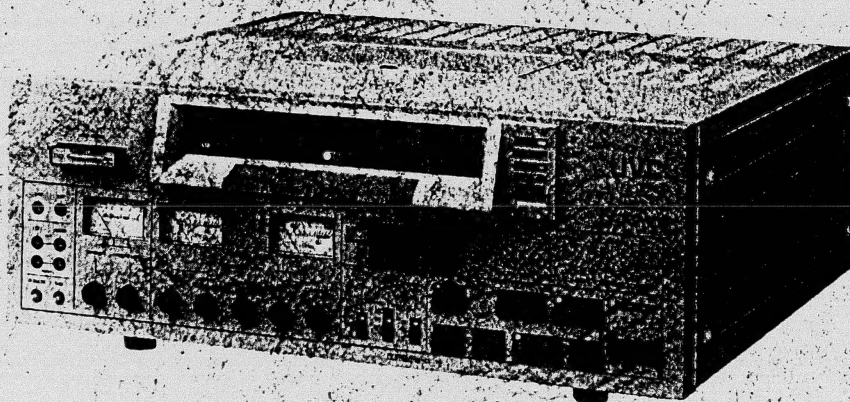


JVC

SERVICE MANUAL

BR-7000ERA



SPECIFICATIONS

VHS Hi-Fi

GENERAL

Format	: VHS 1/2" PAL Standard
Power requirement	: 220/240 V~, 50/60 Hz
Power consumption	: 43 watts (Max. 55 watts with remote control unit, 12 V \square , 550 mA)
Dimensions	: 440(W) x 174(H) x 448(D) mm
Weight	: 17.5 kg
Operating temperature	: 5°C to 40°C
Tape speed	: 23.39 mm/sec.
Recording time	: Max 240 min. with E-240 cassette
FF/REW time	: Less than 4.0 min. for E-180 cassette

VIDEO

Video-signal system	: PAL colour and CCIR monochrome signals, 625 Lines
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	: 1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	: 45 dB (B/W) (Rohde and Schwarz)
Horizontal resolution	: 250 Lines (Colour)

AUDIO

Input	: -6 dBs, 10 k-ohms, unbalanced (Normal)
	: -6 dBs, 10 k-ohms, balanced (Hi-Fi)
Output	: -6 dBs, into 1 k-ohm, unbalanced (Normal, Hi-Fi)
Frequency response	: 20 Hz to 12 kHz (Normal) 20 Hz to 20 kHz (Hi-Fi)
Dynamic range	: 87 dB (Hi-Fi)
Signal-to-noise ratio	: 46 dB (NR-on), 42 dB (NR-off) (Normal) at 3 % distortion
Wow and flutter	: Less than 0.005 % wrms (Hi-Fi)

CONNECTORS

Video input/output	: BNC-type
Audio input	: XLR (Hi-Fi) RCA (Normal)
Audio output	: RCA (Hi-Fi, Normal)
Remote control	: 34-pin connector
AC IN	: 3-Wired AC connector
Accessories	: Hour meter x 1

Design and specifications subject to change without notice.

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the Δ symbol and shaded (影) parts are critical for safety.
Replace only with specified part numbers.
Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
Caution for continued protection against fire hazard.
Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:

- 1) Wires covered with PVC tubing
- 2) Double insulated wires
- 3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:

- | | | |
|--------------------|--------------------------------------|------------|
| 1) Insulation Tape | 3) Spacers | 5) Barrier |
| 2) PVC tubing | 4) Insulation sheets for transistors | |

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

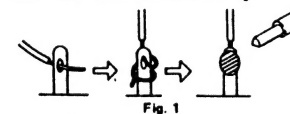


Fig. 1

7. Observe that wires do not contact heat producing parts (heat-sinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.



Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)

In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector

In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

- 1) Connector part number: E03830-001
- 2) Required tool: Connector crimping tool of the proper type which will not damage insulated parts.

3) Replacement procedure

- (1) Remove the old connector by cutting the wires at a point close to the connector.
Important: Do not reuse a connector (discard it).

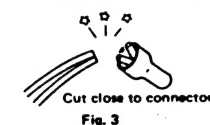


Fig. 3

- (2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

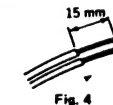


Fig. 4

- (3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

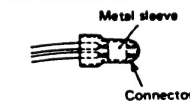


Fig. 5

- (4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

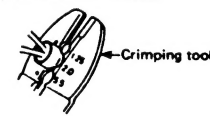


Fig. 6

- (5) Check the four points noted in Fig. 7.

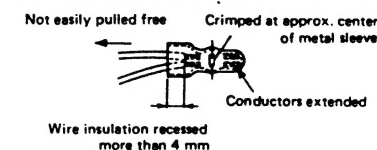


Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

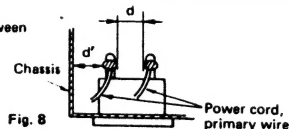


Fig. 8

4. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method: (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

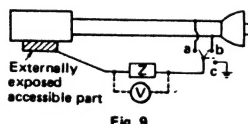


Fig. 9

5. Grounding (Class I model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio In, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

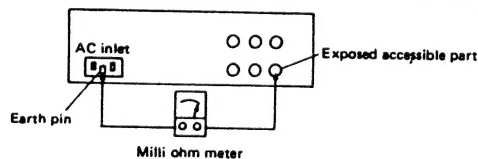


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	$Z \leq 0.1 \text{ ohm}$
Europe & Australia	$Z \leq 0.5 \text{ ohm}$

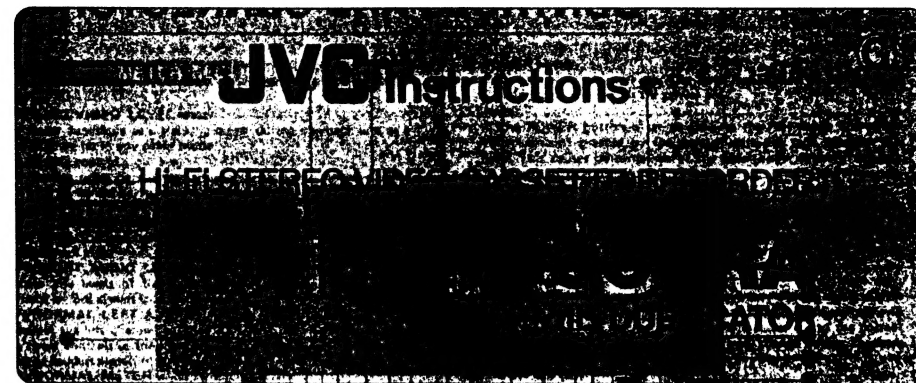
AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V				
100 to 240 V	Japan	$R \geq 1 \text{ M}\Omega / 500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3 \text{ mm}$
110 to 130 V	USA & Canada	—	AC 1.5 kV 1 minute	$d, d' \geq 4 \text{ mm}$
110 to 130 V			AC 900 V 1 minute	$d, d' \geq 3.2 \text{ mm}$
200 to 240 V	Europe & Australia	$R \geq 10 \text{ M}\Omega / 500 \text{ V DC}$	AC 3 kV 1 minute (Class II)	$d \geq 4 \text{ mm}$
			AC 1.5 kV 1 minute (Class I)	$d' \geq 8 \text{ mm}$ (Power cord) $d' \geq 6 \text{ mm}$ (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	$1 \text{ k}\Omega$	$i \leq 1 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	USA & Canada	$0.15 \mu\text{F}$ and $1 \text{ k}\Omega$	$i \leq 0.5 \text{ mA rms}$	Exposed accessible parts
110 to 130 V		$2 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Antenna earth terminals
220 to 240 V	Europe & Australia	$50 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.



WARNING:
TO PREVENT FIRE OR SHOCK
HAZARD, DO NOT EXPOSE THIS
UNIT TO RAIN OR MOISTURE.

Warning Notice FOR YOUR SAFETY (Australia)

1. Insert this plug only into effectively earthed three-pin power outlet.
2. If any doubt exists regarding the earthing, consult a qualified electrician.
3. Extension cords, if used, must be three-core correctly wired.

FOR YOUR SAFETY

Install any external aerial to AS 1417.1

WARNING—THIS APPARATUS MUST BE EARTHED IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

GREEN-AND-YELLOW: EARTH
BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol \equiv or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or which is coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

CAUTION

To prevent electric shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified service personnel.

NOTE: The rating plate and the safety caution are on the rear of the unit.

POWER SYSTEM

Connection to the mains supply
The operating voltage of this set is preset to 240 V~ at the factory.

Before connecting to mains, check that the voltage selector on the rear panel is set to the same voltage as your local mains supply.

Adapting to local power line

This set operates on either 220 or 240 V~. If the preset voltage is different from the power line voltage in your area, reset the voltage selector by inserting a screwdriver into the slot of the voltage selector and turning it until the correct voltage is displayed.

FEATURES

A New Hi-Fi VHS recorder designed exclusively for tape duplication with the following features:

Space-saving, front-loading and rack-mountable VHS recorder.

Heavy-duty mechanism

- Aluminium diecast chassis
- Head drum, capstan and reel servos with independent direct-drive motors to assure stable recording and playback.

Top quality Hi-Fi sound

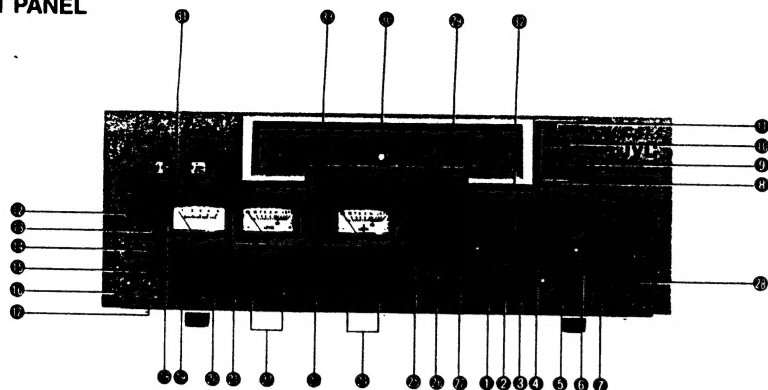
- Independent rotary FM-audio heads
- Frequency response 20 Hz to 20 kHz
- Dynamic range 87 dB
- Harmonic distortion less than 0.7 %
- Wow and flutter less than 0.005 % (WRMS)
- Channel separation more than 60 dB

Duplicator-friendly operation

- Wide opening with a guide for easy loading and unloading of cassette.
 - Large recording indicator for quick, at-a-glance checking.
 - Recording capability of cassette with its recording safety tab removed.
 - Large video/tracking and audio meters
 - Cover for operational control buttons to avoid accidental misoperation.
 - Video AGC on/off switch
- Easy maintenance and serviceability**
- Door for tape path cleaning
 - Hour meter (2000H) indicating drum running time
 - Test points on the front panel

CONTROLS AND CONNECTORS

FRONT PANEL



BASIC FUNCTION BUTTONS

- **EJECT button**
Press to eject the cassette. This button can be pressed in any mode. The EJECT LED will flash during automatic unloading of the cassette and then be extinguished upon completion of ejection.
- **Record button (REC)**
 1. Pressing the REC and PLAY buttons simultaneously during playback engages the Record mode immediately and both REC LEDs light. (The PLAY LED also remains lit.)
 2. Pressing the REC and PLAY buttons simultaneously during FF or REW engages the Stop mode first, then starts tape loading, after which recording begins.
 3. Pressing the REC and PLAY buttons simultaneously in the Stop mode starts tape loading immediately, after which recording begins.
 4. In cases 2 and 3 above, both REC LEDs light continuously and the PLAY LED blinks during tape loading and remains lit together with the two REC LEDs when recording begins.
 5. If, during PLAY, the REC button is pressed, the E-E mode is entered for both video and audio, while the REC button is being held pressed. The picture may be distorted at switching points from PLAY to E-E or from E-E to PLAY. This is normal.
- **Rewind button (REW)**
 1. Pressing the REW button in the Stop or Fast Forward mode engages the Rewind mode immediately, the REW LED lights.
 2. Pressing the REW button in the Play, Pause, Record or Record Pause mode has no effect. (The current mode remains engaged.)
 3. When the REW button is pressed during tape unloading (the STOP or EJECT button has been pressed in the Play or Record mode and the STOP or EJECT LED is blinking), the REW LED starts blinking and the STOP or EJECT LED is extinguished. The Rewind mode engages automatically, immediately after completion of tape unloading, with the REW LED remaining lit.
- **STOP button**
 1. Pressing the STOP button during playback or recording starts tape unloading and engages the STOP mode.
 2. Pressing the STOP button in the Fast Forward or Rewind mode, likewise, engages the Stop mode immediately.
 3. During tape unloading the STOP LED blinks; upon completion of unloading, the STOP LED remains lit.
- **PLAY button**
 1. Pressing the PLAY button in the Stop mode starts tape loading immediately for playback.
 2. Pressing the PLAY button in the Fast Forward or Rewind mode causes the Stop mode to be entered first, then tape loading starts for playback.
 3. The PLAY LED blinks during tape loading, and remains lit upon completion of loading.

1 PAUSE button

1. Pressing the PAUSE button in the Play mode stops tape running immediately, changes the video signal to the E-E mode and mutes the audio output. The PLAY LED is extinguished and the PAUSE LED lights.
 2. Pressing the PAUSE button during the Record mode stops tape running with the Record mode still engaged. The PLAY LED remains lit, the PAUSE LED lights and both REC LEDs begin flashing.
 3. To release the Pause mode to resume playback or recording, press the PLAY button.
 4. The Record Pause mode can also be entered by pressing the REC and PAUSE buttons in the Stop, Rewind or Fast Forward mode.
- **Fast Forward button (FF)**
Same operation as the REW button.

INDICATOR SECTION

- **REC indicator**
- **Hi-Fi REC indicator**
Lights when the Hi-Fi audio signals are being recorded, with the Hi-Fi REC select switch ● set to ON or REMOTE.
- **WARNING indicator**
This LED lights when the tape is not running properly or condensation occurs inside the unit.
- **Noise reduction (NR) indicator**
Lights when the noise reduction switch (NR) is set to ON.

TEST POINTS

- **Hi-Fi audio head output signal test point (A-RF)**
The Hi-Fi audio signal is output in the form of an FM signal during playback, allowing clogged or worn heads to be detected.
- **Video head output signal test point (V-RF)**
The video head signal is output in the form of an FM signal during playback, allowing clogged or worn heads to be detected.
- **Hi-Fi audio output signal test points (LEFT and RIGHT)**
To check the signals output from the rear panel Hi-Fi AUDIO OUT connectors.
- **NORMAL audio output signal test points (LEFT and RIGHT)**
To check the signals output from the rear panel NORMAL AUDIO OUT connectors.
- **D-PULSE pin**
Connect to the external trigger terminal of an oscilloscope.
- **GND pin**
Connect to the ground terminal of an oscilloscope.

METER SECTION

- **TRACKING/VIDEO LEVEL meter**
This meter functions as a tracking meter during playback and as a video level meter in any other mode.
 - **TRACKING control**
To minimise noise bars during playback, turn this control so that the meter ● makes its maximum deflection.
 - **VIDEO LEVEL control**
To adjust the video signal level manually, set the VIDEO AGC switch ● to OFF and turn this control so that the meter ● deflects into the green area.
 - **LEFT/RIGHT AUDIO LEVEL meters**
Indicate the levels of the audio signals (playback signals during playback or E-E signals in any other mode).
 - **Hi-Fi/NORMAL LEFT AUDIO REC LEVEL controls**
To adjust the left channel Hi-Fi or NORMAL audio recording level, turn these controls so their corresponding meter ● deflects to "0" with the loudest signal.
 - **Hi-Fi/NORMAL METER select switch**
 - **Hi-Fi/NORMAL RIGHT AUDIO REC LEVEL controls**
To adjust the right channel Hi-Fi or NORMAL audio recording level, turn these controls so their corresponding meter ● deflects to "0" with the loudest signal.
 - **VIDEO AGC switch**
Set to ON to activate the built-in video AGC circuit.
 - **Hi-Fi REC select switch**
 - ON: Set to this position to record the Hi-Fi audio signals.
 - OFF: Set to this position when recording of the Hi-Fi audio signals is not desired. (Also FM carrier signal will be cut off).
- REMOTE: Set to this position to remote-control above function via the serial code remote control.
- **NORMAL AUDIO noise reduction switch (NR)**
Set to ON to activate the built-in Dolby* noise reduction system to reduce tape hiss.

● POWER button

Press to turn the power on. The level meters will be illuminated. Pressing again will switch the power off.

Note:

If the POWER button is set to OFF in the Play mode, the pinch roller remains pressed by the capstan with the tape between the two. This causes deformation of the pinch roller rubber, resulting in irregular tape movement. Therefore, set the POWER button to OFF only after confirming that the unit is in the Stop mode. (During actual tape unloading, while the STOP LED is blinking, do not press the POWER button.)

- **Tape COUNTER and COUNTER RESET button**
This counter indicates the relative position on the tape. Pressing the COUNTER RESET button sets the counter to 0000.

- **Cassette loading slot**
With the POWER button pressed to on, insert a video cassette with its labelled edge facing toward you. The cassette carriage itself will automatically take control and retract the cassette into the correct loaded position. The lower door flap will change colour to show that a cassette is loaded.

● HOUR METER

This indicates the total operating time. After 2000 hours of operation, the red line moves to the right end of the scale. (Attach the meter securely before use.)

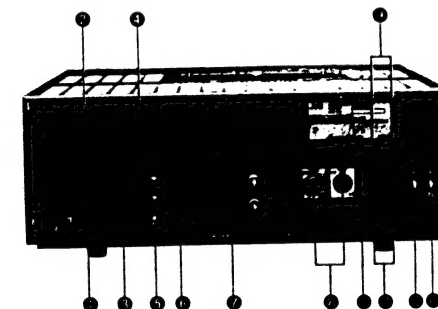
● Guard cover mounting hole

- **Tape path maintenance door**
For access to the tape path for cleaning, use a screwdriver to remove this cover.

* Dolby noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.

Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

REAR PANEL



- **AC input socket (AC IN)**
Connect to a 220 or 240 V \sim , 50/60 Hz power outlet.
- **VOLTAGE SELECTOR**
Using a screwdriver, turn until the correct voltage (220 or 240 V) is displayed.
- **FUSE holder**
- **SERIAL CODE IN/OUT connectors**
- **Ground terminal**
- **REMOTE control connector (34-pin)**
- **VIDEO IN/OUT connectors**
- **Hi-Fi AUDIO IN connectors (LEFT and RIGHT)**
- **NORMAL AUDIO IN connectors (LEFT and RIGHT)**
- **Hi-Fi AUDIO OUT connectors (LEFT and RIGHT)**
Deliver signals of the Hi-Fi audio track.
- **NORMAL AUDIO OUT connectors (LEFT and RIGHT)**
Deliver signals of the longitudinal audio track.
- **FULL REPEAT switch**
 - ON: Set to this position to repeatedly play back the pre-recorded tape in its entirety.
 - OFF: Set to this position when the repeat function is not desired.
- **AUDIO INPUT SELECT switch**
 - H COM: Set to this position to record the audio signals being input to the Hi-Fi AUDIO IN connectors onto both the Hi-Fi and longitudinal audio tracks — a "Hi-Fi Combined" recording.

SEP: Set to this position to record the signals being input to the Hi-Fi AUDIO IN connectors onto the Hi-Fi audio track, and to the NORMAL AUDIO IN connectors onto the longitudinal audio track — a "Separate" recording.

N COM: Set to this position to record signals being input to the NORMAL AUDIO IN connectors onto both the Hi-Fi and longitudinal audio tracks — a "Normal Combined" recording.

TEST POINTS

The output signals from the Hi-Fi audio heads, video heads, Hi-Fi audio track and normal audio track are available at the front panel test points. Connect an oscilloscope to these test points to check the performance and condition of the unit.

Connection	Items to be checked	Standard waveform
Hi-Fi audio head output 	<ul style="list-style-type: none"> • Tape-to-head contact • Tape running stability • Inferior RF after head replacement 	<ul style="list-style-type: none"> • "4" triggered
Video head output 	<ul style="list-style-type: none"> • Compatibility of tape pattern • Tape-to-head contact • Tape running stability • Tracking • Video signal recording level • Abnormality in RF 	<ul style="list-style-type: none"> • "4" triggered
Hi-Fi audio output 	<ul style="list-style-type: none"> • Quality of recording and playback 	<ul style="list-style-type: none"> • Approx. -6 dBs output at reference input level • Output impedance: less than 5 k-ohms
Normal audio output 	<ul style="list-style-type: none"> • Quality of recording and playback • Tape-to-head contact, dirty head (fluctuation of audio level) • Alignment of audio/control head 	<ul style="list-style-type: none"> • Approx. -6 dBs output at reference input level • Output impedance: less than 5 k-ohms

SPECIFICATIONS

GENERAL

Format	: VHS 1/2" PAL Standard
Power requirement	: 220/240 V~, 50/60 Hz
Power consumption	: 43 watts (Max. 55 watts with remote control unit, 12 V ~, 550 mA)
Dimensions	: 440(W) x 174(H) x 448(D) mm
Weight	: 17.5 kg
Operating temperature	: 5°C to 40°C
Tape speed	: 23.39 mm/sec.
Recording time	: Max 240 min. with E-240 cassette
FF/REW time	: Less than 4.0 min. for E-180 cassette

VIDEO

Video signal system	: PAL colour and CCIR monochrome signals, 625 Lines
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	: 1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	: 45 dB (B/W) (Rohde and Schwarz)
Horizontal resolution	: 250 Lines (Colour)

AUDIO

Input	: -6 dBs, 10 k-ohms, unbalanced (Normal)
	: -6 dBs, 10 k-ohms, balanced (Hi-Fi)
Output	: -6 dBs, into 1 k-ohm, unbalanced (Normal, Hi-Fi)
Frequency response	: 20 Hz to 12 kHz (Normal)
	: 20 Hz to 20 kHz (Hi-Fi)
Dynamic range	: 87 dB (Hi-Fi)
Signal-to-noise ratio	: 46 dB (NR-on), 42 dB (NR-off) (Normal) at 3 % distortion
	: Less than 0.005 % wrms (Hi-Fi)

Wow and flutter

CONNECTORS

Video input/output	: BNC-type
Audio input	: XLR (Hi-Fi)
	: RCA (Normal)
Audio output	: RCA (Hi-Fi, Normal)
Remote control	: 34-pin connector
AC IN	: 3-Wired AC connector
Accessories	: Hour meter x 1

Design and specifications subject to change without notice.

SECTION 1 GENERAL DESCRIPTION

1.1 DISASSEMBLY

Improvements of the BR-7000BRA over the BR-7000BR. The performance of the BR-7000ERA Hi-Fi Duplicator is improved over that of the BR-7000ER in the following points:

1. Improved Hi-Fi audio performance
 - 1) Expanded dynamic range (from 82 dB to 87 dB)
 - 2) Reduced switching noise, for cleaner sound recording and playback
 - 3) Enhanced reliability through the more intensive use of ICs and automated insertion of circuit components
 - 4) Improved control linearity of the Hi-Fi REC LEVEL controls on the front panel (improved from curve A to curve B)
2. Improved drum/capstan circuits
 - The three circuit boards forming the drum and capstan servo circuits and the drum MDA circuit have been integrated into one circuit board through the more intensive use of ICs, and the number of points to be adjusted has been reduced from 12 to two, thus greatly improving reliability.

3. Alteration of the mother board

- The mother board has been changed to accommodate the single circuit board made possible by the integration of the drum/capstan servo circuits and the drum MDA circuit.

4. Mechanical changes

- 1) The capstan motor has been changed.
- 2) The drum assembly has been changed while retaining the same video heads as the BR-7000ER, for improved linearity and tape interchangeability.
- 3) The sub-deck has also been changed to accommodate the new drum assembly.
- 4) The reel motor has been changed to obtain higher torque.
- 5) Head clogging has been eliminated by the addition of a video head cleaning mechanism, thus enhancing reliability.
- 6) The dew sensor has been changed to accommodate the new sub-deck.
- 7) The drum head relay circuit board has been changed to accommodate the new sub-deck.

1.2 EXTERNAL COVERS

- Top cover
 1. Take out two screws and remove the top cover in the rearward direction.
- Front panel
 1. Remove the top cover.
 2. Take out five screws and remove the front cover.
- Bottom cover
 1. Take out six screws and remove the bottom cover.

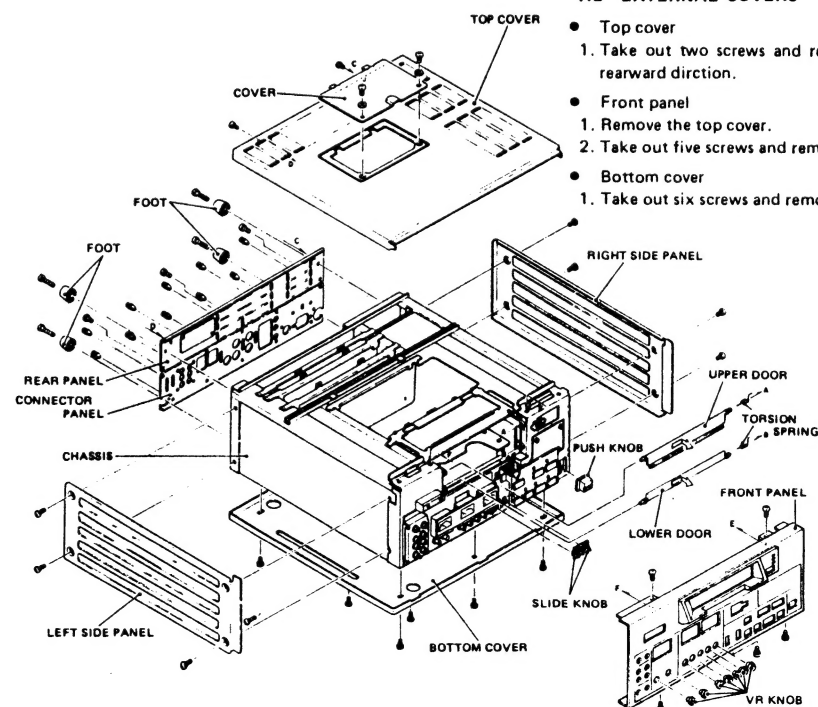


Fig. 1.1 External covers

- Rear panel
 1. Remove the top cover and feet.
 2. Take out three screws and remove the rear panel.
- Connector panel
 1. Take out ten plastic rivets and remove the connector panel.
- Upper door and Lower door
 1. Remove the front panel.
 2. Move the lower door in the arrow direction to remove it. Use care regarding the torsion spring.
 3. In the same manner, move the upper door in the arrow direction to remove it. Use care regarding the torsion spring.

4. When reassemble the doors, perform the following:
 - 1) Observe the upper door and recognize the mark on the gear portion.
 - 2) Set the long straight part of the torsion spring toward the upper door.
 - 3) Install the upper door in the state with the mark corresponding with the mark of the upper door opener on the cassette housing.
- Right and Left side panel
 1. Each side panel can be removed by taking out four screws.

1.3 CIRCUIT BOARD ASSEMBLIES

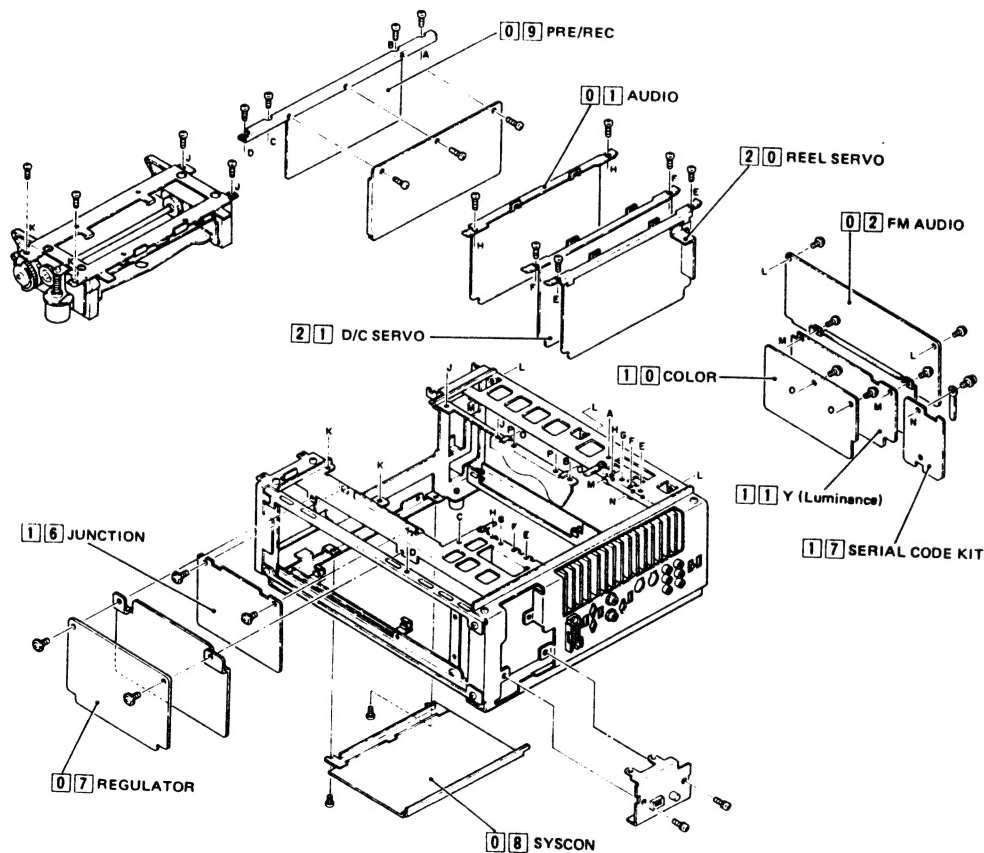


Fig. 1-2 External covers

SECTION 2 MECHANICAL ADJUSTMENT

2.1 FOREWARD

Mechanism adjustments described in this section are only those considered necessary for field services, and some kind of adjustments requiring highly precise equipment and technique are excluded. Periodical checkup and maintenance are very important to keep the machine with the original performance as well as to prevent tapes from damage. Adjustments which require specified tools and jigs must be performed with them.

2.2 REQUIRED JIGS AND EQUIPMENT

For proper and complete adjustments the following jigs and equipment are necessary. If adjustments are done without those jigs and tools, it takes a long-time trial and error and it ends with unsatisfactory results in accuracy and performance. Besides the following, general-purpose tools including hexagonal wrenches (1.5 mm and 2.4 mm) are necessary.

Note: For test equipment and jigs necessary for electrical adjustments, refer to Section 3 "Electrical Adjustment".

Alignment tapes MH-2, MH-F8	Parallel check plate PUJ50204	Height gauge PUJ42147-2	Master plane fixture PUJ42146
Torque gauge PUJ48075-3	TU guide height gauge PUJ44650	A/C head positioning Tool PUJ44653	
Cassette torque meter PUJ42881, PUJ42881-B	Microchecker PUJ49712-2	Thickness gauge PUJ48017	

Fig. 2-1 Jigs and adjusting equipment

2.3 LOCATION OF MAIN PARTS

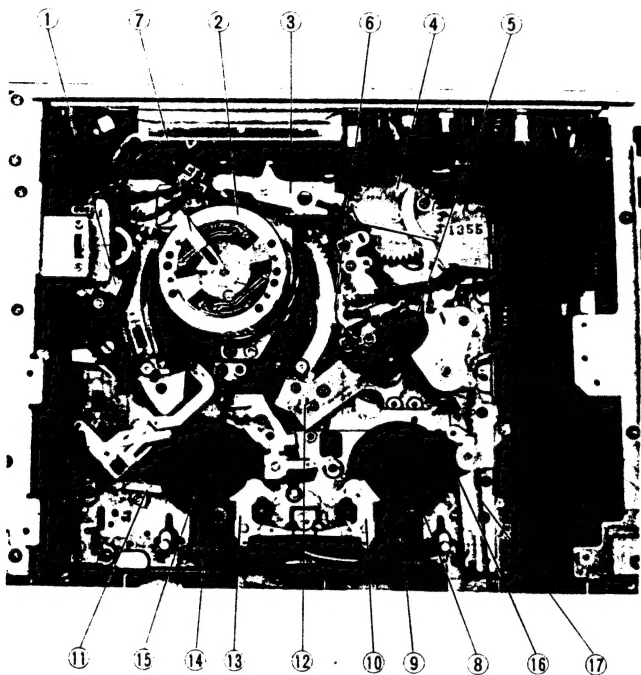


Fig. 2-2 Chassis (Top view)

Ref. No.	Parts No.	Parts Name	Description
1	PU54397	Full Erase Head	
2	PDM2104B	Upper Drum Ass'y	
3	PRD40505	Cleaner Arm Ass'y	
4	PRD40070B	Pinch Roller Arm Drive Gear Ass'y	
5	PQ40137A	Pinch Roller Ass'y	
6	PGZ00271	A/C Head Ass'y	
7	PDM4162A	Brush Ass'y	
8	PGZ00896A-01	T.U Reel Disk Ass'y	
9	PU55701	T.U Photo Interrupter	
10	PU50535D	T.U Brake Ass'y	
11	PU51390A	Tension Band Ass'y	
12	GL-450V	Cassette LED	
13	PU50535C	SUP. Brake Ass'y	
14	PU55701	SUP. Photo Interrupter	
15	PGZ00897A-01	SUP. Reel Disk Ass'y	

Table 2-1

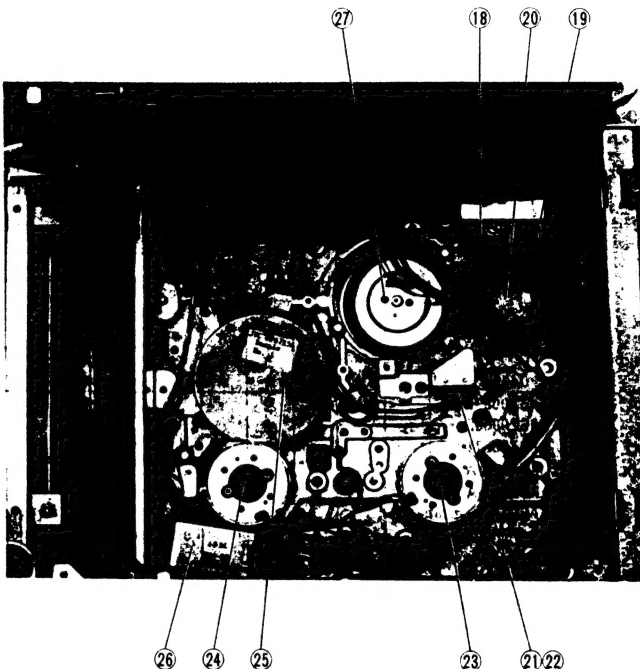


Fig. 2-3 Chassis (Bottom view)

Ref. No.	Parts No.	Parts Name	Description
16	PRD40084-1	Counter Belt	
17	" -2	Counter Belt	
18	PGZ00032A-1	Loading Drive Gear Ass'y	Incl. 17 and 18
19	PU50350	Loading Belt	
20	PU52745A	Loading Motor Ass'y	
21	QSM1S11-211	Switch	
22	" -211	A.L. Switch	
23	PGZ00895	SUP. Reel Motor	
24	"	T.U Reel Motor	
25	PGZ00877	Capstan Motor	
26	PGZ00092	Brake Solenoid	
27	PDM2105B-2	Lower Drum Motor Ass'y	

Table 2-2

2.4 SERVICING SCHEDULE FOR MAIN COMPONENTS

System	Parts Name	Parts No.	Periodic Service Schedule (Operating Hours)										Reference Section
			500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension pole												2.5.9 2.5.2 2.5.3
	SUP slant pole												
	SUP guide roller												
	SUP guide pin												
	SUP guide pole												
	SUP impedance roller												
	SUP brake												
	Capstan												
	TU Brake		★	★	★	★	★	★	★	★	★	★	
	TU guide roller												
	TU slant pole												
	TU guide pole												
	Full erase head	PU54397	★	★	★	★	★	★	★	★	★	★	
	A/C head ass'y	PGZ00271	★	★	★	★	★	★	★	★	★	★	
Drive System	Upper drum ass'y	PDM21048	★	★	★	★	★	★	★	★	★	★	2.5.6 2.5.7 2.5.5 2.5.1 2.5.8 2.5.2 2.6.7
	Lower drum motor ass'y	PDM21058-2	★	★	★	★	★	★	★	★	○	★	
	Pinch roller	PQ40137A	★	★	★	★	★	★	★	★	★	★	
	SUP reel motor	PGZ00895				●				●			
	TU reel motor	PGZ00895				●				●			
	Capstan motor	PGZ00877								●			
	Cassette housing motor	PQ40090A										●	
	Loading motor	PU52745A										●	
	Counter Belt	PRD40084-1								●			
	Counter Belt	PRD40084-2								●			
Others	Counter Belt	PRD40084-3								●			2.5.8 2.5.2 2.6.7
	Loading belt	PU50350		★		●		★		●		★	
	Brush ass'y	PDM4162A				●				●			
	Tension band ass'y	PU51390A				●				●			
	Hour Meter	PGZ00124				●				●			
	Head cleaner	PRD40510-01-02				●				●			

★ Cleaning ○ Check ● Replacement

Note: ● The above schedule is just a reference for machines used in an average condition.
● Life time of the upper drum greatly depends on working conditions.

Table 2-3 Periodical servicing schedule

2.5 MAIN PARTS REPLACEMENT

When replacing parts, remove external coverse, circuit boards, shield covers, cassette housing, etc., as required.

2.5.1 Cassette housing and cassette motor

Note: Avoid operating the slide plate within with fingers, etc. when dismantling the cassette housing without using a cassette. Danger is involved when the reinforcement touches the roof plate at the time of cassette loading.

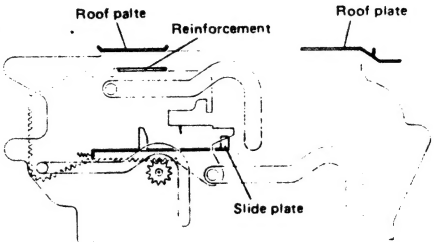


Fig. 2-4 Cassette housing

- [A] Cassette housing removal
1. Disconnect the connector of the cassette housing board.
 2. Remove the mounting screws of the front panel. Shift the top of the front panel forward to facilitate removing the cassette housing.
 3. Take out 4 screws ①. Carefully lift the cassette housing upward to remove it.

Note: To operate mechanism after removal of the cassette housing, observe the following steps.

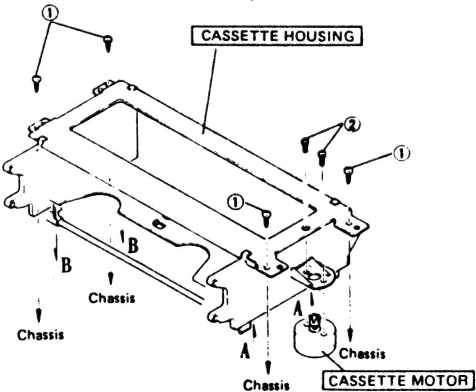


Fig. 2-5 Removint cassette housing

- Operation preset

This configuration allows operating the mechanism with the cassette housing removed. Perform as follows.

- a) Place the cassette housing upside down on the rear bracket, as shown in Fig. 2-6. Engage the connectors of the cassette housing with the cassette housing board.
- b) Insert cassette and perform loading.
- c) After completion of loading and the sensors are enabled, use the operation switches to select the desired modes.

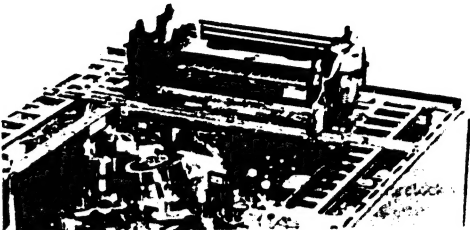


Fig. 2-6 Mechanism functions

- [B] Cassette motor
- 1) Remove the cassette housing. Quickly unsolder the wires of the cassette motor.
 - 2) Take out 2 screws ② and replace the cassette motor (see Fig. 2-5).
 - 3) Use care regarding motor wire polarity and reassemble by reversing the above steps.

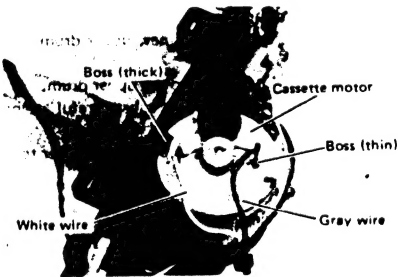


Fig. 2-7 Cassette motor wiring

2.5.2 Upper drum

1. Remove two screws (DPSP3006ZY) fixing the brush ass'y to take it off.

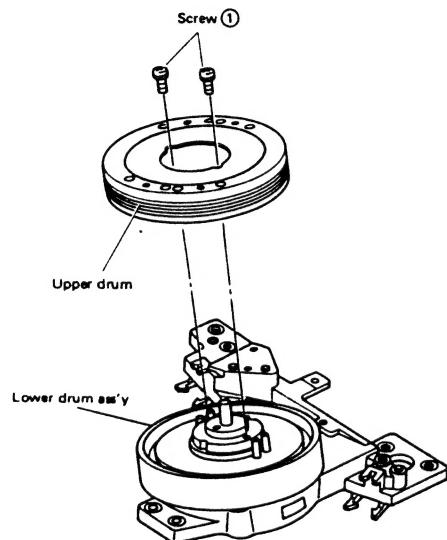


Fig. 2-8 Upper drum replacement

2. Unsolder the upper drum board by an unsoldering iron to take it off, remove a screw ① and then pull out the upper drum upwards.
3. Clean contact surfaces of a new upper drum and lower drum.
4. Fix the upper drum board to the upper drum.
5. Set the upper drum with the most careful attention to its position.
6. Adjust excentricity of the upper drum. (Refer to Section 2.5.4.)
7. Install the brush assembly.

When re-assembling, take care so that its contact point slightly comes off the center of the drum shaft but to be within 2 mm dia.

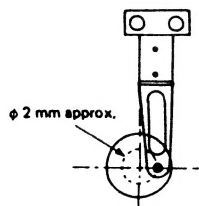


Fig. 2-9

8. After replacement, perform the following checks and adjustments.

- 1) Tape transport system adjustment
- 2) Switching point (Sect. 3.5.2)
- 3) Sub tracking (Sect. 3.5.3)
- 4) Head resonance and Q (Sect. 3.8.11)
- 5) REC FM level (Sect. 3.8.10)
- 6) PB level and channel balance (Sect. 3.8.12)
- 7) REC color level and channel balance (Sect. 3.8.17)

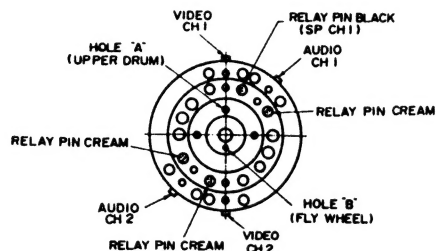


Fig. 2-10 Upper drum wiring

Note: Use care regarding position when installing the new upper drum. As shown in Fig. 2-10, observe that hole "A" (2.7 mm dia.) of the upper drum and hole "B" (1.6 mm dia.) of the flywheel are positioned 180° apart.

2.5.3 Lower drum motor ass'y

Note: The drum motor and the lower drum cannot be replaced separately.

1. Take off the cleaning ass'y behind the drum ass'y.
2. Take off the upper drum.
3. Remove screws ④ and pull out the drum ass'y upwards.
4. Install a new lower drum motor ass'y in the reverse order of the disassembling. At this time, be careful not to damage and scratch it.
5. Adjust eccentricity of the upper drum.
6. Perform the same checkup and adjustment as that for the upper drum replacement.

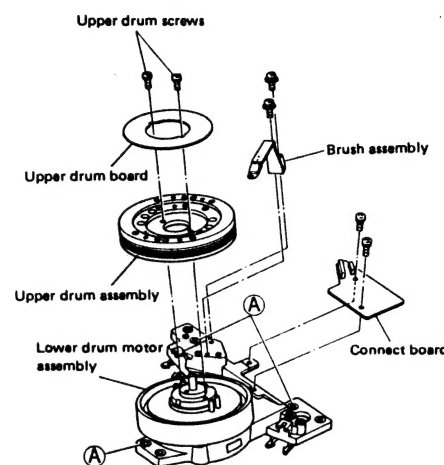


Fig. 2-11 Lower drum motor assembly

2.5.4 Upper drum eccentricity

- If the upper drum is mounted even slightly out of center with respect to the drum shaft, relative head-to-tape speed becomes inconsistent within the rotation period of the upper drum. This can cause jitter and picture distortion.
- After the upper drum is replaced, perform the following adjustments.

1. Set the operation preset and then set for the Play mode.
2. After completion of loading, switch off the power.
3. Remove the earth plate.

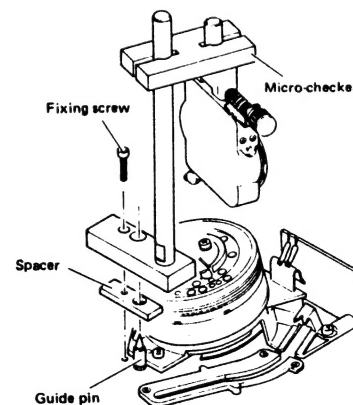


Fig. 2-12 Micro-checker mounting

4. Set the micro-checker (PUJ49712-2) on the guide pin as shown in Fig. 2-12. Use the accessory hex wrench (metric) to tighten the fixing screw.
5. Gradually turn the fine adjust knob clockwise so that the dial indicator registers zero on the scale. Adjustment of ± 10 scale divisions is possible on the outer frame, but do not turn more than that.
6. While using care not to apply lateral pressure to the drum, slowly turn the upper drum and read the deviations indicated by the micro checker. Check for needle deflection within 2 microns (± 1 microns).
7. If deviation is greater than 2 microns, turn the fine adjust knob counterclockwise to disengage the test probe from the drum. Loosen the 2 screws of the upper drum, carefully adjust the position, then retighten the 2 screws in a balanced manner. Afterwards, again use the micro-checker to check the eccentricity.
8. After using, turn the fine adjust knob counterclockwise and remove the micro-checker.
9. Install the earth plate.
10. Supply power and set for the Stop mode. Be sure to remove the cover.
11. Connect oscilloscope to TP8 of the Pre/Rec board.
12. Gradually turn the TRACKING control and confirm simultaneously maximum CH-1 and CH-2 waveforms.
13. If difference is obvious, remove the upper drum, clean the bottom face of the upper drum and the lower drum flywheel. Reinstall and repeat above steps 1 to 10.

Microchecker handling

1. The Microchecker is a high precision instrument. Do not subject it to vibration or shock.
2. Do not apply unnecessary force to the measuring probe.
3. The meter and holder position and direction have been pre-adjusted. Do not disassemble or disturb the adjustment.
4. The meter outer rim can be turned about ± 10 scale divisions. Do not turn it forcibly (more than 300 g-cm).
5. Use care that the Microchecker does not directly contact the upper drum (particularly the video heads).
6. Before setting the Microchecker, turn the calibration knob counterclockwise. Avoid contacting the upper drum when setting.
7. When setting, confirm that the measuring probe operating direction is centered on the upper drum.
8. If rubbing or grating sound occurs during measurement, the setting is incorrect. Also check for contamination of the upper drum and measuring probe.
9. Since the instrument is set while the loading arm is extended, power must not be supplied while the Microchecker is being used.

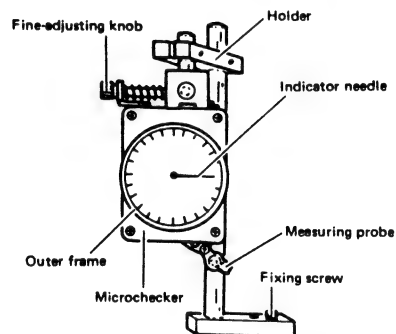


Fig. 2-13 Micro-checker

2.5.5 Capstan motor assembly

The capstan motor cannot be replaced as a single motor component. Replace the capstan motor ass'y which includes the capstan, capstan FG and flywheel when the capstan motor requires replacement. Do not take out the two screws on the bottom side.

1. Disengage the connector from the capstan motor assembly (from the bottom side).
2. Take out the three screws and remove the capstan motor ass'y.
3. Install a new capstan motor ass'y by reversing the above steps.

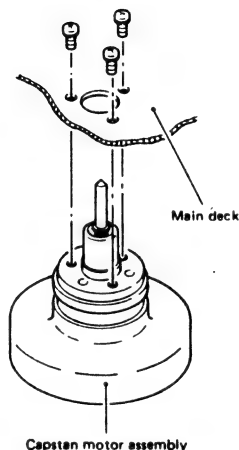


Fig. 2-14

2.5.6 Supply reel motor

1. Remove the cassette housing ass'y (refer to section 2.5.1).
2. Take out screw ① and move the tension band to the side.
3. Take out the screw ② and E-ring then remove the supply reel FG board and supply brake.
4. Loosen the setscrew and remove the supply reel disk ass'y in the upward direction.
5. Disengage the connector, from the reel motor (from the bottom side).
6. Take out the four motor screws and remove the supply reel motor.
7. Install a new supply reel motor and reassemble by reversing the above steps.
8. Perform the reel disk height adjustment (refer to section 2.6.2).

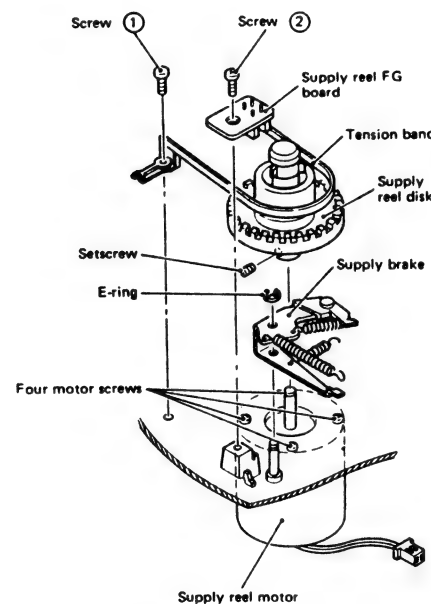


Fig. 2-15 SUP. reel motor

2.5.7 Take-up reel motor

1. Remove the cassette housing ass'y (refer to section 2.5.1).
2. Take out the screw and two E-ring, then remove the take-up reel FG board and take-up brake.
3. Loosen the setscrew and remove the take-up reel dis-ass'y in the upward direction.
4. Loosen the two screws and remove the brake solenoid.
5. Disengage the connector from the take-up reel motor.
6. Take out the four screws and remove the take-up reel motor.
7. Install a new take-up reel motor and reassemble by reversing the above steps.
8. Perform the reel disk height adjustment (refer to section 2.6.2).

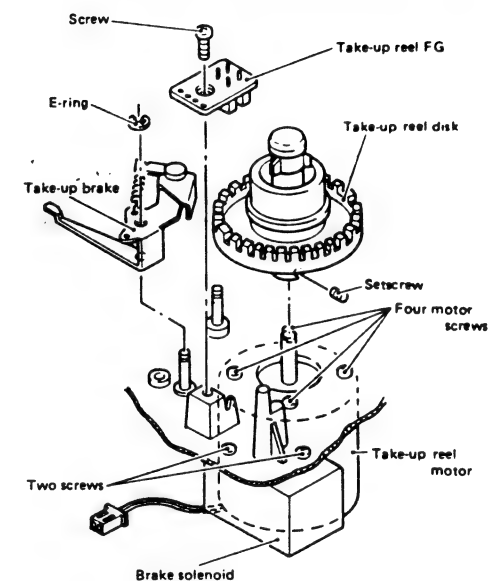


Fig. 2-16

2.5.8 Loading drive gear assembly/loading motor

Note: Before replacing the loading motor, carefully observe its mounting condition (particularly wire polarities, positioning and clamping).

1. Take out the two screws (A) and remove the loading drive gear assembly.
2. Unsolder the wires from the motor terminals.
3. To replace loading drive gear assemblies, place a new assembly by reversing the above steps and proceed to 7 below and after. In case of motor replacement, proceed to 4 below.
4. Disengage the belt from the pulley, take out the two screws (B) and remove the motor from the loading gear assembly.
5. Place a new loading motor and reassemble by reversing the above steps. At the time, use care as to wire polarities. Use a 0.5 mm thickness gauge to mount the motor pulley.
6. Move the pole base on the subdeck by hand to the loading end position and install the loading gear assembly.
7. Turn the loading motor pulley by hand to move the loading ring slightly in the unloading direction. Check for equal spacing between the supply pole guide and supply pole base, and between the take-up pole guide and take-up pole base. See Fig. 2-18. If not equal, the loading gear ass'y mounting position is incorrect. Repeat the above step 6.

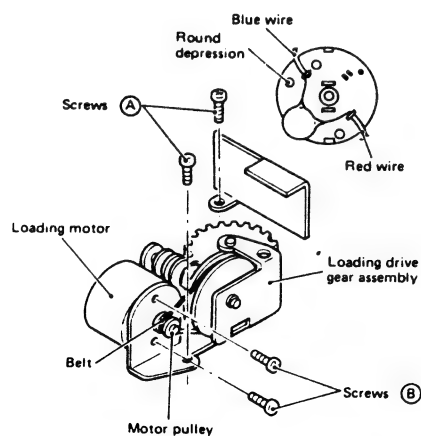


Fig. 2-17 Loading motor replacement

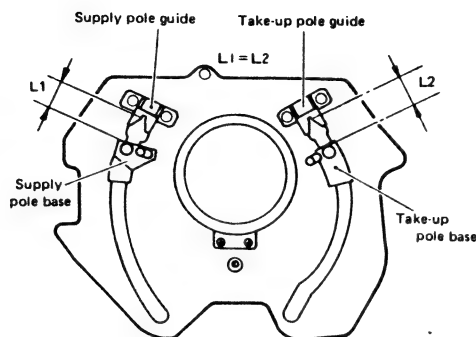


Fig. 2-18 Loading ring check

2.5.9 Audio/control (A/C) head assembly

1. Take out screws (A), (B) and (C) to remove the A/C head assembly.

Note: Use care so that the coil springs do not come off from the bottom side of the A/C head assembly.

2. Remove the A/C head circuit board. Use care not to damage the wires.
3. Replace the A/C head subassembly and reassemble by reversing the above steps.
4. Perform the following checks and adjustments.
 - 1) Audio/control head parallel (refer to section 2.6.11)
 - 2) Tape transport (refer to section 2.7)
 - 3) Audio/control head height (refer to section 2.8.4)
 - 4) Audio/control head azimuth (refer to section 2.8.5)
 - 5) Audio/control head position (refer to section 2.8.7)
 - 6) Interchangeability adjustment (refer to section 2.8)
 - 7) Audio adjustment (refer to section 3.7)

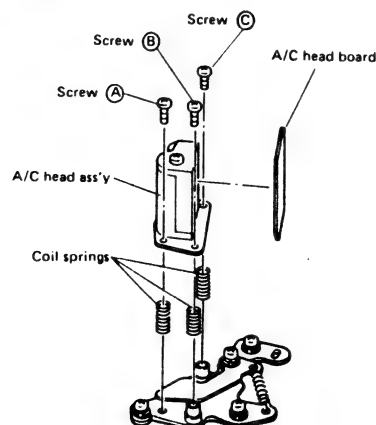


Fig. 2-19 A/C head replacement

2.6 CHECKS AND ADJUSTMENT

2.6.1 Master plane jig setting

1. Remove the cassette housing assembly.
2. As shown in Fig. 2-20, position the master plane jig with respect to the reference shaft, pinch roller shaft and the stud.

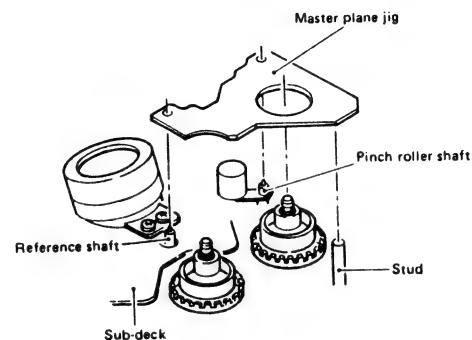


Fig. 2-20 Master plane jig setting

2.6.2 Reel disk height

1. Set the master plane jig.
2. Use the height gauge (PUJ42147-2) to confirm that the reel disk height. Measure at 2 places 90° apart. When measuring, press the reel disk downward to compensate for mechanical play.
3. The correct height is between planes A and B, as shown in Fig. 2-21. If necessary, loosen the setscrew and adjust to the correct height.

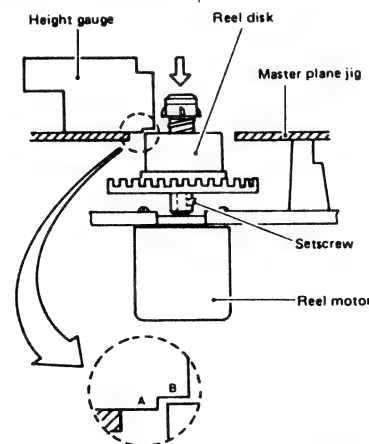


Fig. 2-21 Reel disk height adjustment

2.6.3 Supply guide pole height

1. Set the height gauge (PUJ42147-2) on the subdeck and check the perpendicularity.
2. Confirm that the height of the lower face of the upper flange.
3. If guide pole height has been adjusted, tape transport adjustments are required (refer to section 2.7).

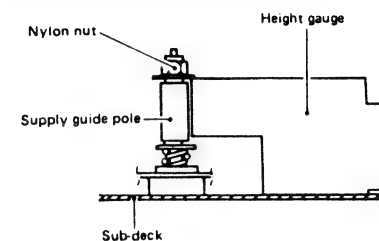


Fig. 2-22 Supply guide pole height adjustment

2.6.4 Take-up tape guide roller height

1. Set the master plane jig. Use the height gauge (PUJ44650) to confirm that the height of the lower face of the upper flange.
2. If necessary, loosen the setscrew on the lower part, then adjust the height by turning the screw on the top.
3. If the height has been adjusted, tape transport adjustments are required (refer to section 2.7).

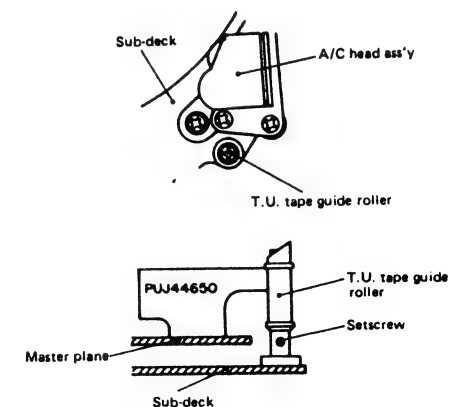


Fig. 2-23 Take-up tape guide roller height adjustment

2.6.5 Take-up tape guide roller parallel

1. Put the plane surface of A/C head parallel check plate against the capstan shaft and take-up guide roller.
2. Check that the parallel degree between the capstan shaft and take-up tape guide roller is less than 0.05 mm.

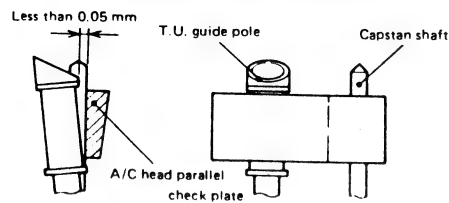


Fig. 2-24 Take-up guide roller parallel

2.6.6 Pinch roller

1. By hand, press the pinch roller pressure arm toward the arrow A to the point where it contacts the capstan.
2. Check that the parallel degree between the pinch roller and capstan is less than 0.05 mm.

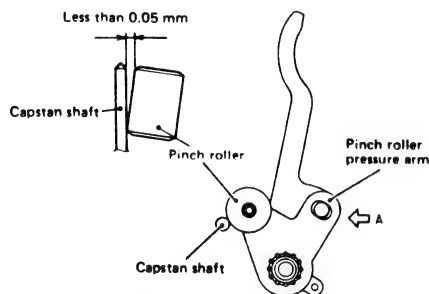


Fig. 2-25 Pinch roller

2.6.7 Tension band

1. Take out screw ① and remove the tension band holder.
2. Disengage the tension band from the tension arm, and replace the tension band.
3. Perform the tension pole position check and adjustment and the back tension check (refer to sections 2.6.8 and 2.6.9).

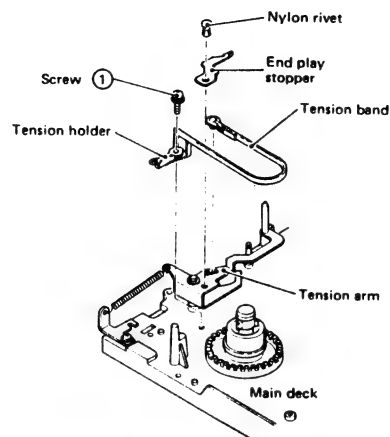


Fig. 2-26 Replacement of tension band

2.6.8 Tension pole position check

1. Set for the Play mode of the operation preset.
2. Confirm that the center of the tension pole lies upon the center line of the sub-deck hole as shown in Fig. 2-27.
3. If necessary, loosen screw ① and adjust the tension band holder to obtain the correct tension pole position.

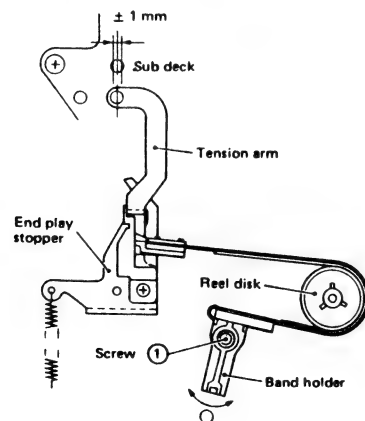


Fig. 2-27 Tension pole position

2.6.9 Back tension check

1. Perform the following check after completing tension pole position check (refer to section 2.6.8).
2. Use the back tension cassette gauge and set for the Play mode (PUJ42881).
3. During the Play mode, check that the left side meter indicates 41 ± 1 g-cm. If not the correct value, replace the tension band (refer to section 2.6.7).

2.6.10 Tension pole perpendicularity

1. Set for the Play mode of the operation preset. Turn off the power in this state.
2. Set the height gauge on the subdeck and press the tension arm toward the arrow B to the point where the tension arm contact the height gauge lightly.
3. Check that the perpendicularity degree between the tension pole and height gauge is less than 0.05 mm.

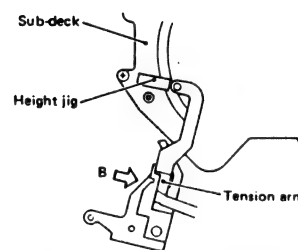
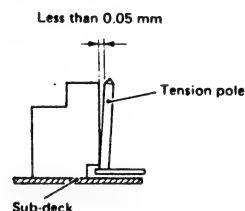


Fig. 2-28 Tension pole perpendicularity

2.6.11 Audio/control head parallel

1. Confirm the audio/control head parallel using the A/C head parallel check plate.
2. Put the A/C head parallel check plate against the audio/control head as shown in Fig. 2-29 and confirm that the inclination is less than 0.1 mm as shown by A.
3. Put the plane surface of the plate against the audio/control head and check that there is no space in the upper portion as shown by B.

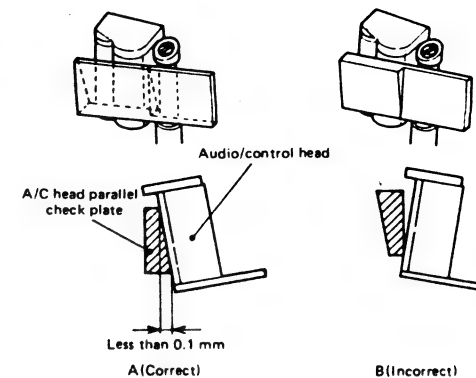


Fig. 2-29

2.6.12 Torque adjustment

Perform the following checks and adjustment after completing reel servo adjustment.

[A] Loading supply back tension

1. Use the cassette torque meter (PUJ42881) and set for the Play mode.
2. During the loading mode, check that the left side meter indicates 33 ± 10 g-cm.
3. If not, adjust R29 of the reel servo board for 33 ± 10 g-cm (between TP-10 and heatsink of Q10 level of the reel servo board is 30 ± 2 mV).

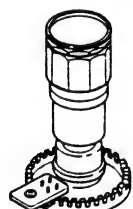
[B] Playback back tension

1. Use the cassette torque meter (PUJ42881) and set for the Play mode.
2. During the Play mode, check that the left side meter indicates 41 ± 5 g-cm.
3. If not, confirm that the tension pole position.
4. If 41 ± 5 g-cm back tension cannot be obtained by step 3, replace the tension band (refer to section 2.6.7).

[C] Playback take-up torque

1. Use the cassette torque meter (PUJ42881) and set for the Play mode.
2. During the Play mode, check that the right side meter indicates 100 ± 20 g-cm.
3. If not adjust R142 of the reel servo board for 100 ± 20 g-cm.

- [D] Fast Forward (FF) and Rewind (REW) torque
1. Set the operation preset.
 2. Use the torque gauge (PUJ48075-3) and set it on the take-up reel disk.
 3. Hold the torque gauge, then set for the FF mode.
 4. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speeds, then read the indication. The correct value is 300 g-cm or more.
 5. In the same manner, check the rewind mode.
 6. If incorrect value, check the reel servo unit.
- [E] Fast Forward (FF) and Rewind (REW) reel brake torque
1. Set the operation preset.
 2. Set for the Stop mode, then let the supply brake and take-up brake move toward the arrow C.
 3. Set the torque gauge on the take-up reel disk. Relax the grip on the gauge so that the disk turns slowly in the direction of the arrow B. Read the indication at the point where the indicator and scale rotate at equal speed. The correct value is 22 ± 7 g-cm.
 4. In the same manner, check the rewind mode. Set the gauge on the supply reel disk and let the disk turn in the direction of the arrow A. The correct value is 22 ± 7 g-cm.



(a) FF/REW Torque

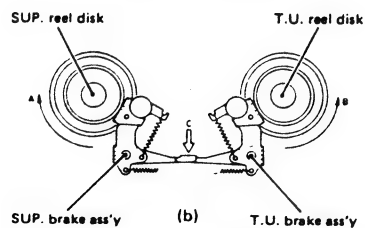


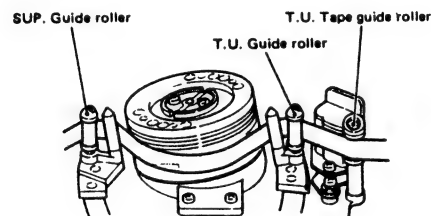
Fig. 2-30

2.7 TAPE TRANSPORT

The tape transport system has been precisely adjusted at the factory and normally does not require readjustment. The following steps are therefore necessary only in case of severe usage or when replacing parts affecting the tape transport system.

2.7.1 Tape transport check

1. Employ a 120 minute tape and check at tape beginning and ending portion according to the following steps.
2. Operate the machine between Loading and Unloading modes several times. Observe the tape at the supply and take-up guide rollers. Confirm absence of curling, wrinkling.
3. During the Play mode, confirm absence of curling, wrinkling.



(a) Guide roller



(b) SUP. Guide pole



(c) T.U. Tape guide roller

Fig. 2-31 Guide roller and Guide pole

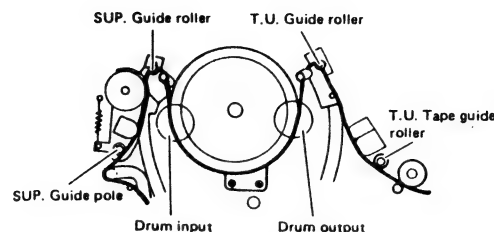


Fig. 2-32 Tape transport check

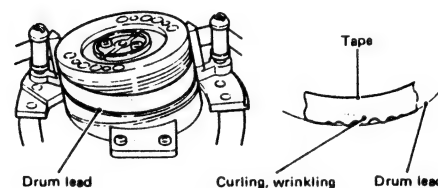


Fig. 2-33 Drum lead check - 2

Notes:

- 1) Slips upward : sound becomes produced by contact between tips of rotating heads and edge of tape.
- 2) Slips downward : tape curls or wrinkles from contacting lead face (sound may also be produced).
- 3) If necessary, perform adjustments according to section 2.7.2.

2.7.2 Tape transport adjustments

Perform only if defects are noted during tape transport check (2.7.1).

If the height has been adjusted, interchangeability adjustments are required (section 2.8).

[A] Guide roller height

1. Loosen the setscrew on the side to be adjusted. Loosen it only enough to allow the guide roller to be turned smoothly with a slotted screwdriver. Use care not to overloosen it.
2. Insert a cassette tape and set for the Play mode.
3. With a slotted screwdriver, turn the guide roller and adjust so that the tape travels smoothly in the drum lead.
4. Check the top edge of the tape travels along the lower face of the upper flange as shown in Fig. 2-34.
5. Tighten the setscrew after completion of adjustment.

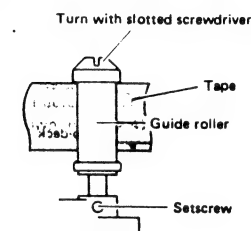


Fig. 2-34 Guide roller

[B] Supply guide pole

1. Use a cassette tape and set for the Play mode.
2. Use a nut driver to adjust so that curling or wrinkling of the tape does not occur at the supply guide pole.

Note: This adjustment must be within 0.5 mm (one nut turn is 0.5 mm) with respect to the height adjusted in section 2.6.3. If there is a large discrepancy, check the height of the supply reel disk, (refer to section 2.6.2), tension pole (refer to section 2.6.10) and other mechanical components.

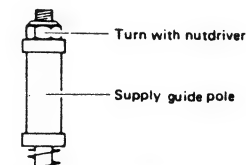


Fig. 2-35 Supply guide pole

[F] Unloading supply tension

1. Use the cassette torque meter (PUJ42881-8) and change for the Stop mode from the Play mode.
2. During the unloading mode, check that the left side meter indicates 52 ± 15 g-cm and the TP-10 level of reel servo board is 65 ± 10 mV DC.
3. If not, adjust R32 of the reel servo board for 52 ± 15 g-cm.

[C] Take-up tape guide roller height

1. Use a cassette tape and set for the Play mode.
2. Loosen the setscrew, and use care not to over loosen it. Adjust by turning the top of the tape guide roller with a slotted screwdriver so that curling or wrinkling of the tape does not occur at the take-up guide roller.
3. Tighten the setscrew after completion of adjustment.

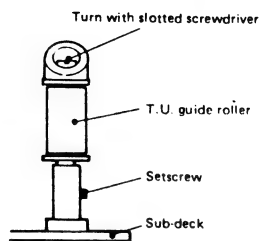
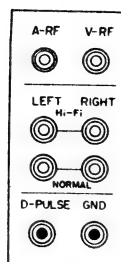


Fig. 2-36 Take-up tape guide roller

2.8 INTERCHANGEABILITY ADJUSTMENT

Before using the alignment tape, employ a cassette tape and confirm correct tape transport referring to section 2.7.



Front service terminal (Front panel)

Fig. 2-37 Check point

- A-RF Refer to section 3.7.1.
- V-RF Refer to section 3.9.1.
- Hi-Fi (FM)
- LEFT } Refer to section 3.7.2.
- RIGHT }
- NORMAL
- LEFT } Refer to section 3.8.12.
- RIGHT }
- D-PULSE Refer to section 3.9.1.

2.8.1 Preliminary checks

1. Connect oscilloscope to V-RF of the Front service terminal (or PRE/REC TP-8). At this time, trigger the oscilloscope externally with the signal from D-PULSE of the Front service terminal (or TP-5 of the D/C servo board).

2. Play staristep signal segment of the alignment tape MH-2).

3. Turn the tracking control and adjust for maximum FM output.

4. Observing the oscilloscope, adjust the flat portion of the maximum output level ('a' in Fig. 2-38) becomes 4 scale divisions.

In this condition, next confirm that the level 'b' is more than 3.4 scale divisions (-1.5 dB) in comparison to the level 'a'.

At the above measurement, each level should be read at a portion where serrations are comparatively flat.

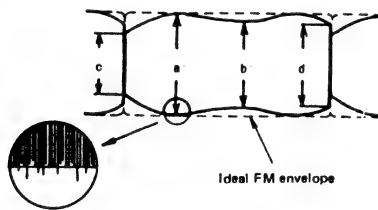


Fig. 2-38 FM waveform (max. output)

5. When levels 'c' and 'd' (for drum intake and outlet) are 4.0 scale divisions respectively, confirm that level drop at either side of SUP and TU is more than 2.8 scale divisions (-3.0 dB).
6. Turn the Tracking control from end to end. The waveform variation should be nearly parallel as shown in Fig. 2-39 and 2-40.

7. If steps 4 to 6 above are unsatisfied, adjustments are required.

Perform adjustments of section 2.8.2 to 2.8.9.

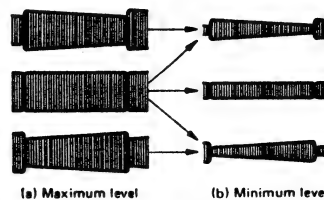


Fig. 2-39 Normal waveform examples



Fig. 2-40 Incorrect waveform examples

2.8.2 Preliminary adjustments

1. Connect oscilloscope to V-RF of the Front service terminal.

Trigger the oscilloscope externally with the signal from D. PULSE of the Front service terminal.

2. Play staristep signal segment of the alignment tape MH-2.

3. Turn the Tracking control and adjust for maximum FM output.

Drum input

4. Refer to Fig. 2-41. Examples of incorrect waveforms are shown by A and B.

Adjust the supply guide roller so that the rising portion (drum input portion) of the waveform becomes flat as shown by C.

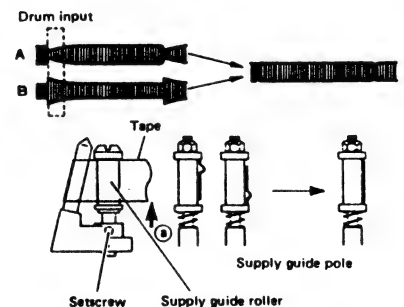


Fig. 2-41 Drum input adjustment

5. Observe the top edge of the tape travels along the lower face of the upper flange and check the waveform does not fluctuation as the tape is lightly pushed up at point (a) as shown in Fig. 2-41.

6. At this time, confirm absence of curling or wrinkling at the guide pole. If contact noise is heard, reconfirm section 2.6.3 and 2.7.

Drum output

7. In the same manner as for the drum input, turn the take-up guide roller to adjust the decay portion (drum output portion) of the FM waveform. Incorrect examples are shown by D and E in Fig. 2-42, while F indicates the correct adjustment.

8. Observe the top edge of the tape travels along the lower face of the upper flange and check the waveform does not fluctuation as the tape is lightly pushed up at (b) as shown in Fig. 2-42.

9. At this time, confirm absence of curling or wrinkling at the take-up tape guide roller. If contact noise is heard, reconfirm section 2.6.4 and 2.7.

10. Carefully and evenly adjust screws (A), (B) and (C) to align the audio/control head height with the tape as shown in Fig. 2-43.

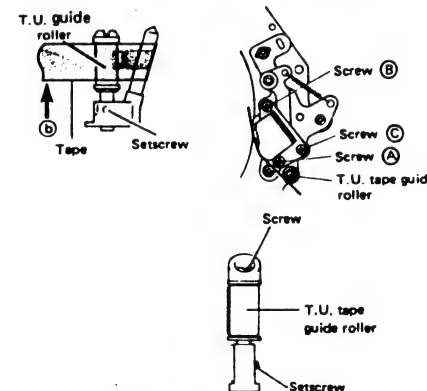
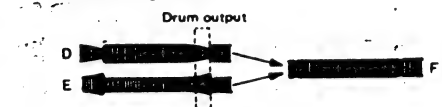


Fig. 2-42 Drum output adjustment

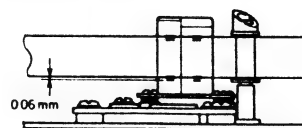


Fig. 2-43 Audio/control head height

2.8.3 Fine adjustment

1. After completion of preliminary checks, connect oscilloscope to V-RF terminal. Observe FM waveform and adjust the Tracking control for minimum FM output level. Trigger the oscilloscope externally with the signal from D. PULSE terminal.
2. If the waveform becomes as shown by A or B of Fig. 2-44, carefully adjust the supply guide roller height so that the waveform becomes as shown by E, F or G of Fig. 2-45.
3. If the FM waveform appears as shown by C or D in Fig. 2-44, carefully adjust the take-up guide roller height to obtain a waveform such as shown by E, F or G of Fig. 2-45.

At this time, if the waveform fluctuates, adjust to the point of minimum fluctuation.

4. Vary the Tracking control from maximum to minimum FM output. The waveform variation should be nearly parallel as shown in Fig. 2-46. If not, readjust items in section 2.8.2 and 2.8.3.
5. Confirm the audio/control head height (section 2.8.4), azimuth (section 2.8.5) and audio/control head position (section 2.8.7).



Fig. 2-44 Minimum FM output (incorrect examples)



Fig. 2-45 Minimum FM output (correct examples)

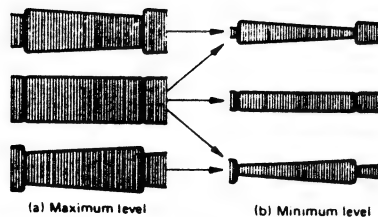


Fig. 2-46 Correct waveform

Note: Setscrew tightening

- 1) After confirming absence of tape wrinkling and other transport irregularities, tighten the setscrews while in the Stop mode.

Since the guide rollers are easily moved, use care when tightening.

- 2) Again perform the preliminary checks (refer to section 2.8.2).

2.8.4 Audio/control head height

1. Connect an oscilloscope to LEFT/RIGHT (NORMAL) of the Front service terminal.
2. Play 1 kHz signal segment of the alignment tape MH-1.
3. Check that the audio CH-1 (LEFT) output level increase does not exceed 0.5 dB as the tape is lightly pressed down point (a) as shown in Fig. 2-47.
4. In the same manner, check that the audio CH-2 (RIGHT) output level increase does not exceed 0.5 dB as the tape is lightly pushed up at point (b).
5. If level increase is more than 0.5 dB in step 3 or 4, perform following adjustment.

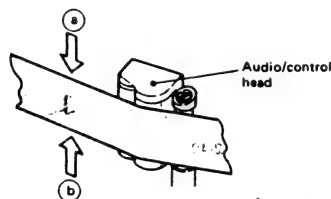


Fig. 2-47 Audio head height check

6. Connect CH-1 probe of the oscilloscope to LEFT (NORMAL) and CH-2 probe to RIGHT (NORMAL) of the Front service terminal.
7. Adjust the oscilloscope for equal maximum levels for CH-1, when the tape is lightly pressed downward at point (a), and CH-2, when the tape is lightly pressed upward at point (b).
8. Turn screws (A), (B) and (C) in succession by small and equal increments at a time to adjust for the same levels between CH-1 and CH-2.
9. If tape curling, wrinkling, etc. occurs at the T.U. tape guide roller, reconfirm section 2.6.4 and 2.7.

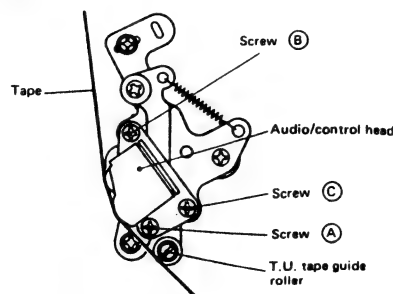


Fig. 2-48 A/C head height adjustment

2.8.5 Audio/control head azimuth

- Perform the following steps only after completing section 2.8.4.
1. Connect CH-1 probe of the oscilloscope to LEFT (NORMAL) terminal and CH-2 probe to RIGHT (NORMAL) terminal.
 2. Play 6 kHz signal segment of the alignment tape MH-2.
 3. Adjust screws (A) and (B) (shown in Fig. 2-48) for both maximum output levels and absence of phase difference between CH-1 and CH-2.
 4. Confirm the audio/control head height (section 2.8.4).

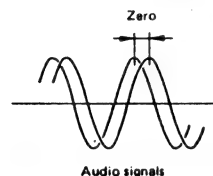


Fig. 2-49 Audio head phase adjustment

2.8.6 Servo circuit adjustment

1. Perform P.B./REC switching point adjustment (refer to section 3.5.2).
2. Perform Sub Tracking adjustment (refer to section 3.5.3).

Note: Sub Tracking adjustment has been precisely adjusted at the factory normally does not require readjustment.

The following adjustment are therefore necessary only in case of H distortion becomes produced by during the P.B. mode to E-E mode or when replacing Sub, Tracking VR.

2.8.7 Audio/control head position

Perform the following steps only after completing section 2.8.1 through 2.8.5.

1. Connect oscilloscope to V-RF of the Front service terminal.
2. Take out a screw of the cleaner assembly.
3. Play staircase signal segment of the alignment tape MH-2.
4. Turn the Tracking control and confirm that the maximum FM level is obtained at the center click position.
5. If not, set the Tracking control to center click position.
6. Loosen the three screws (D), (E) and (F) and slide the audio/control head assembly fully in the direction of the drum (indicated by the arrow) as shown in Fig. 2-50.
7. Slightly tighten the three screws (D), (E) and (F) and play staircase segment of the alignment tape MH-2.

8. Set the audio-control head position tool (PUJ44653) as shown in Fig. 2-51.
9. Slowly turn the tool and set the audio/control head assembly to the position where the second maximum peak FM level is obtained. See Fig. 2-52.
10. Confirm section 2.8.1 through 2.8.6.

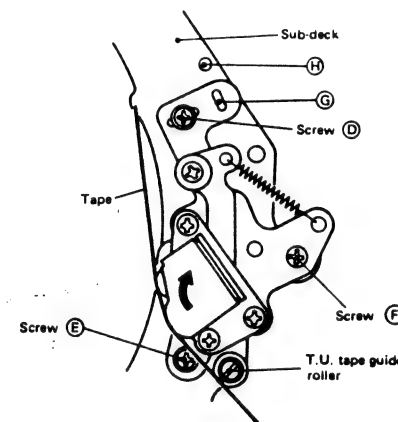


Fig. 2-50

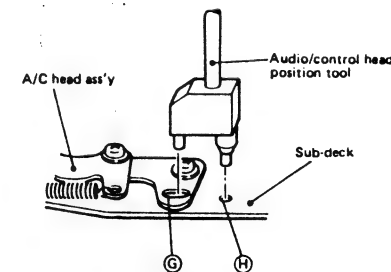


Fig. 2-51

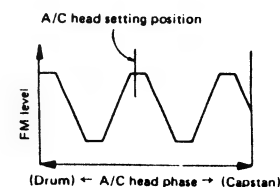


Fig. 2-52

2.8.8 Final checks

1. Reconfirm section 2.8.1.

If incorrect FM waveform, replace the upper drum assembly (refer to section 2.5.2).

2. Connect an oscilloscope to V-RF and A-RF (or TP-7 of the FM Audio board) of the Front service terminal.

With dual trace mode, trigger the oscilloscope externally with signal from D. PULSE of the Front service terminal.

1) Play stairstep signal segment of the alignment tape MH-2.

2) Set the trigger to + slope and observe the video FM waveform (CH-2).

3) Turn the Tracking knob to obtain the maximum video FM waveform.

At this time play carrier signal segment of the alignment tape MH-F8 and observe the audio FM waveform (b).

4) Turn the Tracking knob to obtain the maximum audio FM waveform (a).

Observe the audio FM waveform (a) and confirm that the level difference between audio FM waveform (b) and the maximum level (a) obtained manually is:

$$\frac{b}{a} \geq 0.9$$

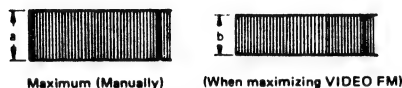


Fig. 2-53 Audio FM output level

5) When the maximum video FM waveform, confirm the audio FM waveform (Fig. 2-54) obtained that:

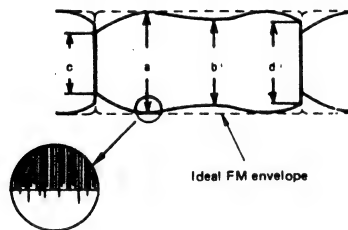


Fig. 2-54 FM waveform (max. output)

$$\frac{b}{a} \geq 0.8, \frac{c}{a} \geq 0.64, \frac{d}{a} \geq 0.64$$

(Specifications of audio FM waveform)

Note: If the FM dropout is noted, perform the FM audio switching point adjustment (refer to section 3.7.5) before confirmation.

6) Play back audio FM waveforms (CH-1 and CH-2) which were recorded without audio signal input respectively, and confirm that both of them meet the FM waveform specification.

Check level variation of the FM waveforms, which should be more than 3.6 scale divisions as the reference is 4 scale divisions on the oscilloscope. (VIDEO: -1.0 dB, FM AUDIO: -1.0 dB)

Also check that the FM level drop is more than 3.0 scale divisions against 4 scale divisions. (VIDEO: -2.5 dB, FM AUDIO: -2.5 dB)

Change the tape to a thin blank tape (T-160) and perform recording and playback in the same manner as above to confirm again that the FM level drop is less than -4 dB (more than 2.5 scale divisions against 4 scale divisions).

Note: For observing FM AUDIO waveform on the oscilloscope, connect the probe to TP7 of the FM AUDIO board.

7) If FM waveform is still incorrect by the adjustments from the steps 1 through 5, replace the upper drum assembly (refer to section 2.5.2).

Note: Refer to section 2.8.9.

3. Perform overall checks and adjustments of the servo circuit and video, and then perform the audio circuit adjustment.

2.8.9 Reference

1. When audio FM waveform is not yet standardized after the final checks (section 2.8.8), a satisfactory result can be obtained by adjusting heights of the audio and video heads with a VH microscope (PUJ42990) used as an adjusting equipment.

2. Referring to section 2.5.1 set the machine into the operation preset condition for Play mode and then turn off the power.

1) Set the VH microscope (PUJ42990) on the guide pin as shown in Fig. 2-55.

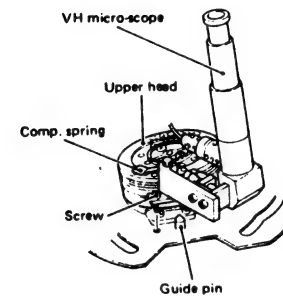
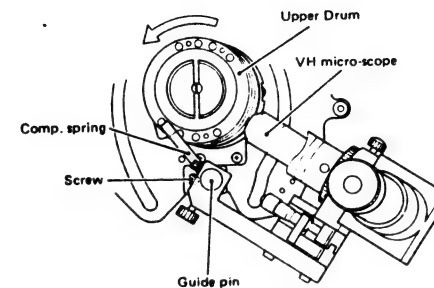


Fig. 2-55 VH microscope setting

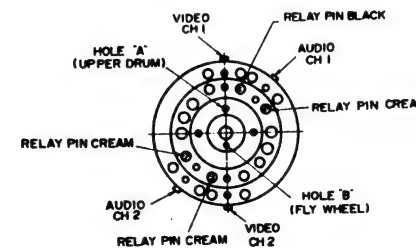


Fig. 2-56 Head position

2) Confirm that "H" of the value of the relative height between V2 and A1 is as shown in the following table.

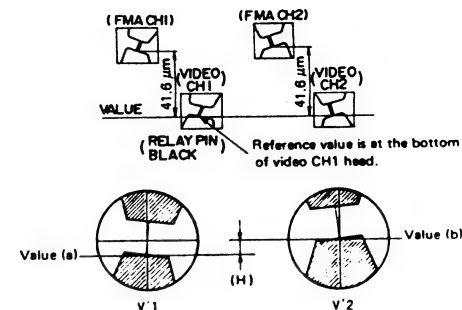


Fig. 2-57 Audio head and video head heights

A/V head	V2 - A1	V1 - A2	V1 - V2	A1 - A2
H	41.6 ± 1 μ	41.6 ± 1 μ	0 ± 1 μ	0 ± 1 μ

• How to confirm "H" value

- 1) Read the value of "a" of V2 on the VH microscope.
- 2) Lifting the rotation prevention spring upwards turn the upper drum slowly counterclockwise and stop it at the position A1 and fix the spring. At this position read the value (b).
- 3) Read the value of "H" (difference between "a" and "b"). (one graduation of the scale is 2 μ)

3) If the value differs from the standard, tighten the set-screw of V2 first, then tighten the A1's setscrew to obtain a satisfactory result.

4) In the same manner as above, read the values and obtain satisfactory results for V1 - A2, V1 - V2 and A1 - A2, respectively.

5) Confirm that the FM waveforms (CH-1/CH-2) recorded and played back without audio signals by the machine are the standard.

3. Totally check up the servo and video systems, and then do for the audio system.

Note: Contact JVC regarding the VH microscope (PUJ42990).

2.8.10 A/C head position (X value)

1. Connect a dual-trace oscilloscope to the front V-RF test point and to the rear panel AUDIO OUT.
2. Set the oscilloscope to "Chop" mode and use internal trigger.
3. Loosen screws ①, ② and ③ to allow sliding the A/C head.
4. Play the MHPE-X alignment tape. Set the TRACKING control to the center detent position.
5. Use the A/C head positioning tool to adjust the head position to align the phases of the audio and FM waveforms. Also adjust for maximum overall FM output.
6. Play the FM AUDIO carrier signal of the MH-F8 alignment tape.
7. Connect the oscilloscope to front A-RF. From the Step 5 position, shift the A/C head to the nearest maximum FM position. Then tighten screws ①, ② and ③.
8. Operate the TRACKING control and confirm maximum FM waveform at the center detent position.

Note: Contact JVC regarding the MHPE-X alignment tapes.

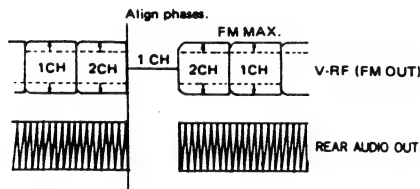
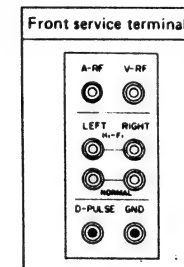


Fig. 2-58

SECTION 3 ELECTRICAL ADJUSTMENTS

3.1 PREPARATION

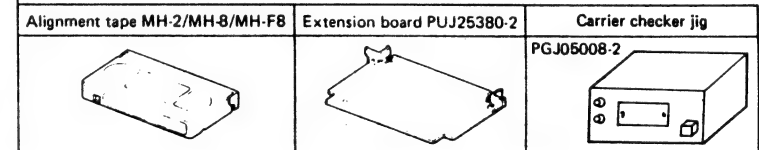
Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.



3.1.1 Required test equipment and jig

1. Digital voltmeter: HEWLETT-PACKARD Model 3476A/B or equivalent
2. Oscilloscope: Wide-band, Dual-trace
3. Signal generator: Color bar, Stairstep
4. Frequency counter: HEWLETT-PACKARD Model 5381A or equivalent
5. Regulated DC power supply
6. Audio generator: Wide-band
7. Alignment tape: JVC MH-2, MH-8, MH-F8
8. Extension board: PUJ25380-2

NOTE: Be sure to first check for smooth and proper tape transport before using the alignment tape.



3.1.2 JVC alignment tape contents

1. MH-2 contents

Segment	Playback Time	Video Signal	Audio Signal	Applications
1	10 minutes	Stairstep	6 kHz	<ul style="list-style-type: none"> Interchangeability checks and adjustments Servo circuit checks and adjustments Audio head azimuth adjustments
2	5 minutes	(none)	3 kHz	<ul style="list-style-type: none"> Tape speed checks Wow and flutter checks
3	10 minutes	Color bar	1 kHz (0 dB)	<ul style="list-style-type: none"> Video signal playback circuit checks and adjustments Audio signal playback circuit checks and adjustments
4	3 minutes	RF sweep	(none)	<ul style="list-style-type: none"> Video head resonance adjustments, Q adjustments

Table 3-1

2. MH-8 contents

Segment	Playback Time	Video Signal	Audio Signal	Applications
1	2 minutes	Color sweep	400 Hz (-20 dB)	<ul style="list-style-type: none"> Video frequency response playback circuit checks and adjustments Audio frequency response playback circuit checks and adjustments
2	2 minutes		100 Hz (-20 dB)	
3	2 minutes		8 kHz (-20 dB)	
4	4 minutes		(none)	

Table 3-2

3. MH-F8 (FM Audio) contents

Segment	Playback Time	Video Signal	Audio Signal	Applications
1	5 minutes	—	Carrier only	<ul style="list-style-type: none"> Interchangeability checks for video and audio
2	5 minutes	—	1 kHz (±50kHz DEV.)	<ul style="list-style-type: none"> FM audio signal playback circuit checks and adjustments

Table 3-3

3.1.3 Check and Adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

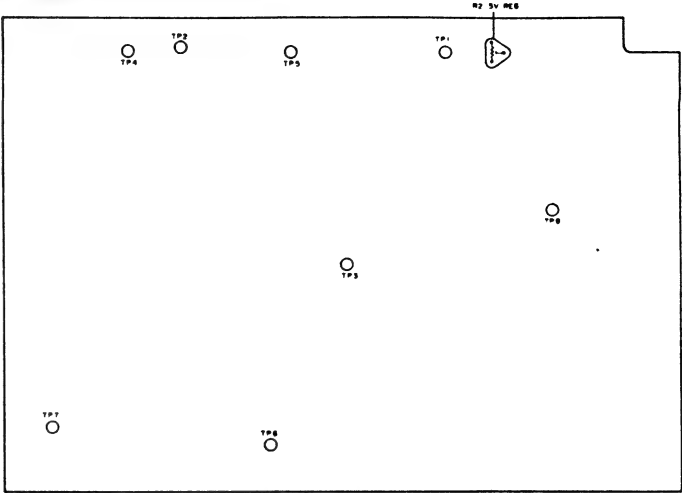
Note: Do not use an alignment tape for the mechanism check and tape run check.
When you make the adjustment using the alignment tape, at first, check the tape run function using the recording tape.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal	Input signal required to perform adjustment. Dash (—) indicates that special signal is not required.
Color bar	Color bar signal as video input
Stairstep	Stairstep signal as video input
1 kHz	Supply a 1 kHz sinewave as audio input signal.
MH-2 Color bar	Play color bar segment of JVC MH-2 alignment tape.
MH-2 Stairstep	Play stairstep segment of JVC MH-2 alignment tape.
MH-2 3 kHz	Play 3 kHz audio signal segment of JVC MH-2 alignment tape.
MH-2 1 kHz	Play 1 kHz audio signal segment of JVC MH-2 alignment tape.
MH-2 RF Sweep	Play RF sweep segment of JVC MH-2 alignment tape.

MH-8 Color seep	Play color sweep segment of JVC MH-8 alignment tape.
MH-8 400 Hz	Play 400 Hz audio signal segment of JVC MH-8 alignment tape.
MH-8 100 Hz	Play 100 Hz audio signal segment of JVC MH-8 alignment tape.
MH-8 8 kHz	Play 8 kHz audio signal segment of JVC MH-8 alignment tape.
MH-F8 Carrier	Play audio carrier segment of JVC MH-F8 alignment tape.
MH-F8 1 kHz (± 50 kHz DEV)	Play 1 kHz (± 50 kHz DEV) audio signal segment of JVC MH-F8 alignment tape.
Mode	Equipment operating mode at time of check or adjustment
STOP	Power on and machine in Stop mode
REC	Recording mode
P.B.	Play mode
REC → (another mode)	Use blank tape, record, then play back in the mode specified.
E-E	Input signal to output
FF	Fast Forward mode
REW	Rewind mode
PAUSE	Pause mode
Loading	Stop mode to playback mode
Unloading	Playback mode to Stop mode
Description and Waveform	This column provides an explanation of the step, notes, adjustment values and waveform diagrams.

3.2 POWER SUPPLY CIRCUIT

Regulator Board Adjustment Point (Top View)



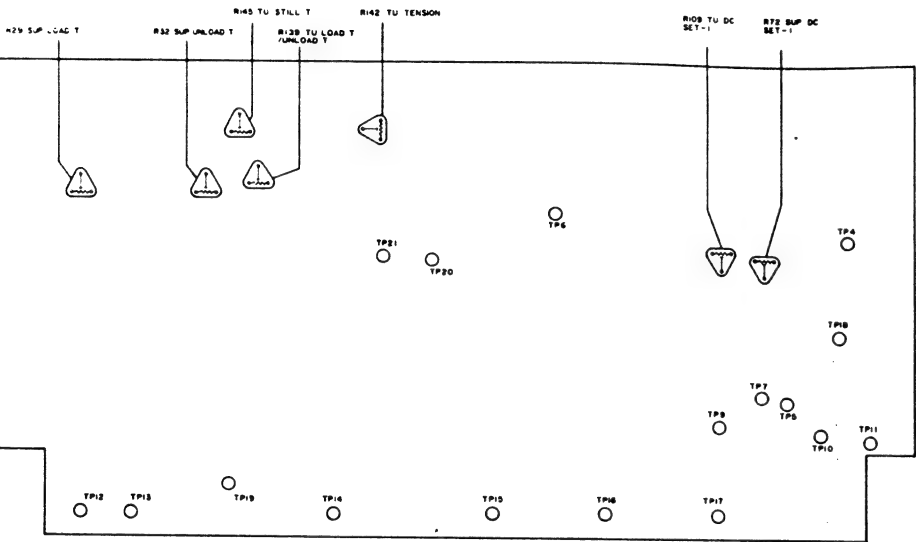
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	5 V DC output voltage	TP-1 [0] [7] Regulator	R2 (5 V Regulator)	—	P.B.	1. Connect the digital voltmeter to TP-1 of the power supply board. 2. Adjust R2 (5 V REG) for 5.0 ± 0.1 V DC.
2	16.5 VDC output voltage	TP-3 [0] [7] Regulator	—	—	P.B.	1. Connect the digital voltmeter to TP-3 of the power supply board. 2. Confirm that the DC voltage becomes 16.5 ± 1.0 V.
3	15 VDC output voltage	TP-6 [0] [7] Regulator	—	—	REC	1. Connect the digital voltmeter to TP-6 of the power supply board. 2. Confirm the DC voltage of 15 ± 1.0 V.
4	12 VDC output voltage	TP-4, TP-5 [0] [7] Regulator	—	—	P.B.	1. Connect the digital voltmeter to TP-4 of the power supply board. 2. Confirm the DC voltage of 12.0 ± 0.2 V. 3. In the same manner, confirm the TP-5.
5	12 VDC output voltage	TP-2 [0] [7] Regulator	—	—	P.B.	1. Connect the digital voltmeter to TP-2 of the power supply board. 2. Confirm that the DC voltage becomes 12.0 ± 0.4 V.

3.3 SYSTEM CONTROL (SYSCON) CIRCUIT

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	IC8 clock frequency	Pin 2 of IC8 [0] [8] Syscon	—	—	STOP	1. Connect frequency counter to pin 2 of IC8 and confirm that the frequency becomes $3,580 \pm 10$ kHz (over 2.5 Vp-p).
2	IC17 clock frequency	Pin 5 of IC17 [0] [8] Syscon	—	—	STOP	1. Connect frequency counter to pin 5 of IC17 and confirm that the frequency becomes 500 to 950 kHz (over 2.5 Vp-p).

3.4 REEL SERVO CIRCUIT

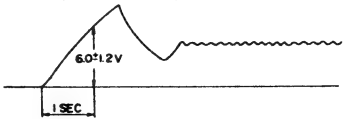
Reel Servo Board Adjustment Point (Top View)



LOADING/UNLOADING MOTOR VOLTAGE

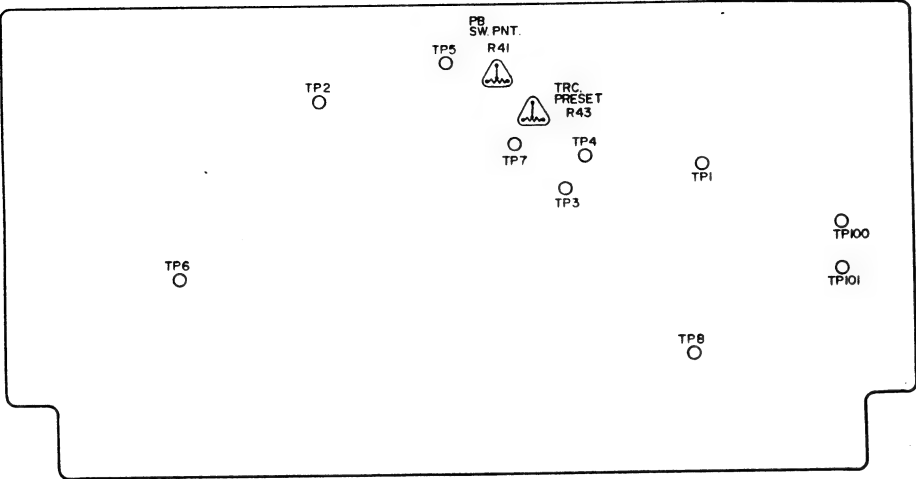
	MODE	TEST POINT	VR	SPEC
SUP MOTOR VOLTAGE	LOADING	TP10	R29	$30 \pm 2 \text{ mV}$
	UNLOADING	TP10	R32	$65 \pm 10 \text{ mV}$
TU MOTOR VOLTAGE	LOADING	TP9	R139	$60 \pm 10 \text{ mV}$
	STILL	TP9	R145	$55 \pm 15 \text{ mV}$
	UNLOADING	TP9	—	$60 \pm 10 \text{ mV}$

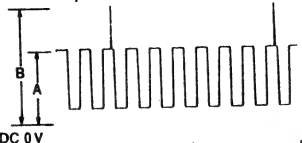
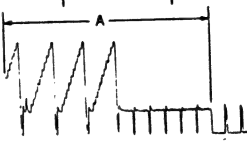
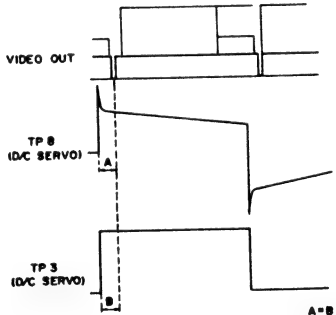
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	SUP. DC Set	TP-5 TP-12(GND) 20 Reel Servo	R72 (SUP. DC SET-1) 20 Reel Servo	—	STOP	1. Connect digital voltmeter to TP-5 of the Reel servo board. 2. Adjust R72 of the Reel servo board to obtain 6.0 V DC.
2	TU. DC Set	TP-7 TP-12(GND) 20 Reel Servo	R109 (TU. DC SET-1) 20 Reel Servo	—	STOP	1. Connect digital voltmeter to TP-7 of the Reel servo board. 2. Adjust R109 (TU. DC SET) of the Reel servo board to obtain 6.0 V DC.
3	SUP. LOAD Tension	TP-10 20 Reel Servo	R29 20 Reel Servo	—	LOAD-ING	See 2.6.12A.
	SUP. UNLOAD Tension	TP-10 20 Reel Servo	R32 (SUP. UNLOAD Tension) 20 Reel Servo	—	UN-LOAD-ING	See 2.6.12F.
4	T.U. Tension	TP-9 20 Reel Servo	R142 20 Reel Servo	—	P.B.	See 2.6.12C.
5	T.U. LOAD/UNLOAD Tension	TP-9 20 Reel Servo	R139 (T.U. LOAD/UNL. T.) 20 Reel Servo		LOAD-ING UN-LOAD-ING	1. Connect oscilloscope to TP-9 of the Reel servo board. 2. Set for the beginning portion of 120-minute tape, during the Loading mode, adjust R139 (T.U. LOAD/UNL. TENS.) of the Reel servo board to obtain DC voltage of $60 \pm 5 \text{ mV}$. 3. During the Unloading mode, confirm that the voltage remains unchanged.
6	T.U. STILL Tension	TP-9 20 Reel Servo	R145 (T.U. STILL TENS.) 20 Reel Servo		P.B. ↓ PAUSE	1. Connect oscilloscope to TP-9 of the Reel servo board. 2. Set for the Pause mode with beginning portion of 120-minute tape and adjust R145 (T.U. STILL TENS.) of the Reel servo board to obtain DC voltage of $55 \pm 15 \text{ mV}$.
7	FF & REW Torque	TP18 (REEL) External Trigger TP19 (REEL)	—	—	REW	1. Connect the oscilloscope's probes to TP18 and TP19 (IC4 pin 1) of the Reel Servo board and supply external trigger pulse to TP19. 2. With T-120 tape loaded by its beginning portion, set the deck to the REW mode. 3. Confirm that voltage at the section A of TP18 becomes $6.0 \pm 1.2 \text{ V}$ 1 sec after that. 4. Set a torque meter to check that FF and REW torque is 430 g-cm each.



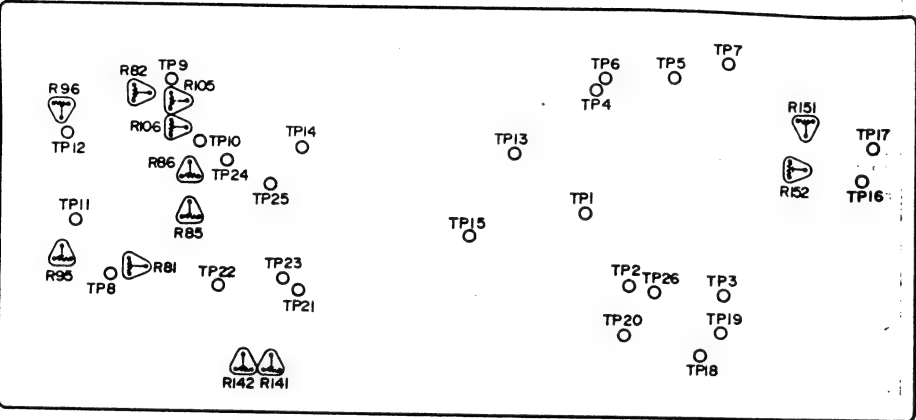
Note: To get the same earth level, the earth of the oscilloscope to be connected to the heatsink of Q10 transistor of the Reel servo board.

3.5 D/C SERVO CIRCUIT
D/C Servo Adjustment Point (Top View)





No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	DRUM FG Level	TP6 (D/C Servo)	—	MH-2 Color Bar	PB	<div>1. Connect the oscilloscope to TP6 of the D/C Servo board.</div> <div>2. Play the alignment tape MH-2.</div> <div>3. Confirm that signal levels A and B are as follows: A = 2.0 – 3.0 V DC B = 4.0 – 5.0 V DC</div> <div><p>A = 2.0~3.0 VDC B = 4.0~5.0 VDC</p></div>
2	P.B. Switch Point	VIDEO OUT	R41 (D/C Servo)	MH-2	PB	<div>1. Connect a probe of the oscilloscope to VIDEO OUT terminal and the other probe to TP5 (or servicing terminal) of the D/C Servo board, and supply external trigger pulse to TP5 (– [minus] slope).</div> <div>2. Play the stairstep segment of the alignment tape MH-2.</div> <div>3. Adjust R41 so that trigger point is 6.5H after V. sync.</div> <div>4. Change the oscilloscope setting for + (puls) slope and confirm that difference between switching points of two channels is within 1H.</div> <div><p>A = 6.5H ⊖ SLOPE EXT. TRIG: TP5 <D/C SERVO></p></div>
3	SUB TRACKING Adjust	VIDEO OUT TP8 (D/C Servo) TP3 (D/C Servo)	R43 (D/C Servo)	Color Bar	REC ↓ PB	<div>1. Supply color bars signal to VIDEO IN terminal.</div> <div>2. Set the TRACKING VR to its center detent position.</div> <div>3. Connect the oscilloscope to VIDEO OUT terminal and TP8 of D/C servo board to observe waveform in dual trace mode. Trigger the oscilloscope at rise of REC CTL pulse of TP8.</div> <div>4. In REC mode, record the section A of the signal (shown in the figure).</div> <div>5. Change connection of the oscilloscope's probe connected to TP8 to TP3 of the D/C servo board and trigger the oscilloscope at rise of TP3's pulse.</div> <div>6. Record the signal, and playing it back adjust R43 to equalize level B with A.</div> <div><p>A = B R43(D/C SERVO) ADJ</p></div>

3.6 FM AUDIO CIRCUIT
FM Audio Board Adjustment Point (Top View)



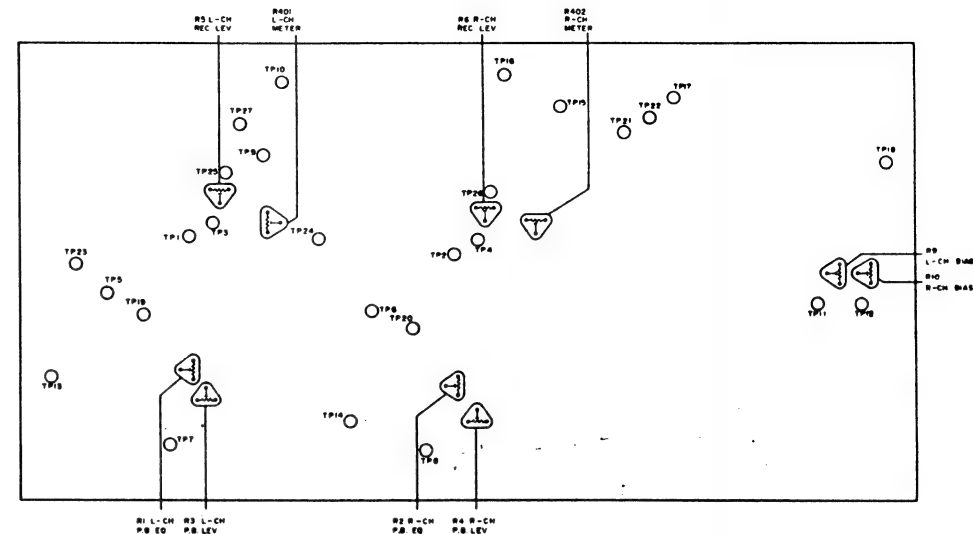
Note: Perform the following steps only after completing item 3.8.9 "Video REC FM Level", 3.8.17 "REC Color Channel Balance & Color Level".

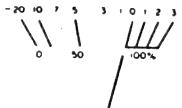

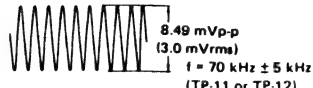
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	Monitor Output Level	Hi-Fi (L/R) Front Service Terminal EXT. REC LEV VR ADJ.	—	1 kHz −6 dBs	E-E	1. After the adjustment of section 3.6.7 was finished, confirm that monitor output is −8 dBs to −4 dBs (0.86 – 1.39 Vp-p).
2	A. FM Carrier Frequency	TP9 (1.4 MHz) TP10 (1.8 MHz) 0 2 FM Audio	R85 (L-CH FM CAR) R86 (R-CH FM CAR) 0 2 FM Audio	—	REC	1. Connect a frequency counter to TP9 and TP10. 2. Adjust R85 so that L-ch frequency is 1.4 MHz $\pm 0_{-50}$ kHz. 3. Adjust R86 to obtain 1.8 MHz $\pm 0_{-50}$ kHz of R-ch frequency.
3	A. FM REC Level	TP2 TP26 (GND) 0 2 FM Audio	R105 (L-CH REC LEVEL) R106 (R-CH REC LEVEL) 0 2 FM Audio	—	REC	1. Set the oscilloscope as specified below. V : 20 mV/div. H : 0.5 μ s/div. 2. Turn R105 fully clockwise and R106 fully counterclockwise viewed from the parts side. 3. Turn R105 counterclockwise until the 1.3 MHz signal level becomes 34 mV.  4. Next, turn R106 clockwise until level of mixed waveform (1.3 MHz and 1.7 MHz signals) becomes 110 mV. 

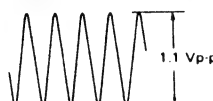
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
4	A. FM P.B. Switching Point	TP16 (FMA) TP17 (FMA) [0] 2 FM Audio D. PULSE	R152 (FMA) R151 (FMA) [0] 2 FM Audio	MH-1 Stairstep	P.B.	<p>1. Connect the oscilloscope's probes to TP16 and TP17. Synchronizing at TP16, observe waveforms at TP16 and TP17 in dual trace mode.</p> <p>2. With the oscilloscope set for \oplus (puls) slope, adjust R152 so that time lag between rise point of TP17 pulse and trailing point of TP16 pulse is 4.7 msec.</p> <p>3. Set the oscilloscope for \ominus (minus) slope and adjust R151 so that time lag between trailing point of TP17 pulse and rise point of TP16 pulse becomes 4.7 msec.</p> <p>This adjustment can be otherwise performed by use of a specified frequency counter for periodicity measurement. (Matsushita's VP-4545A or equivalent)</p>
5	A. FM P.B. Level	Hi-Fi OUT	R95 (L-CH) R96 (R-CH) [0] 2 FM Audio	MH-F8 1 kHz	P.B.	<p>1. Connect the oscilloscope's probe to HiFi LINE OUT terminal and adjust R95 (L-ch) and R96 (R-ch) so that PB level is -6 dBs (1.10 Vp-p) respectively.</p>
6	EXT. Hi-Fi REC LEVER VR	Hi-Fi OUT REC LEV. VR (Front Panel)	REC LEV. VR (Front Panel)	1 kHz -6 dBs (1.1 Vp-p)	E-E	<p>1. Turn the REC LEVEL VR fully clockwise and confirm that output without load is $6.5 - 9.5$ dBs ($4.65 - 6.57$ Vp-p).</p> <p>2. Turn the REC LEVEL VR again to obtain -6 dBs (1.10 Vp-p) of the output level.</p> <p>Note: For all the following adjustments, keep the VR set to this positon.</p>
7	Level Meter	On the Meter	R141 (L-CH) R142 (R-CH) [0] 2 FM Audio	1 kHz -6 dBs (1.1 Vp-p)	E-E	<p>1. Adjust the LEVEL VR so that Hi-Fi OUT level is -6 dBs.</p> <p>2. Adjust R141 (L-ch) and R142 (R-ch) so that the level meter reads 0 dBs respectively.</p>
8	REC Deviation	Hi-Fi OUT	R81 (L-CH) R82 (R-CH) [0] 2 FM Audio	1 kHz -6 dBs (1.1 Vp-p)	REC ↓ P.B.	<p>1. Repeat the adjustment of Section 3.6, item No. 5.</p> <p>2. In recording, turn R81 (L-ch DEV).</p> <p>3. Play back the recorded signal to confirm that PB level is -6 dBs.</p> <p>4. If the PB level does not meet the above specification, repeat the steps 2. and 3. until a result is satisfactory.</p> <p>5. In the same manner as above, adjust R82 (R-ch DEV) to obtain -6 dBs PB level.</p>

3.7 AUDIO CIRCUIT

Audio Board Adjustment Point (Top View)

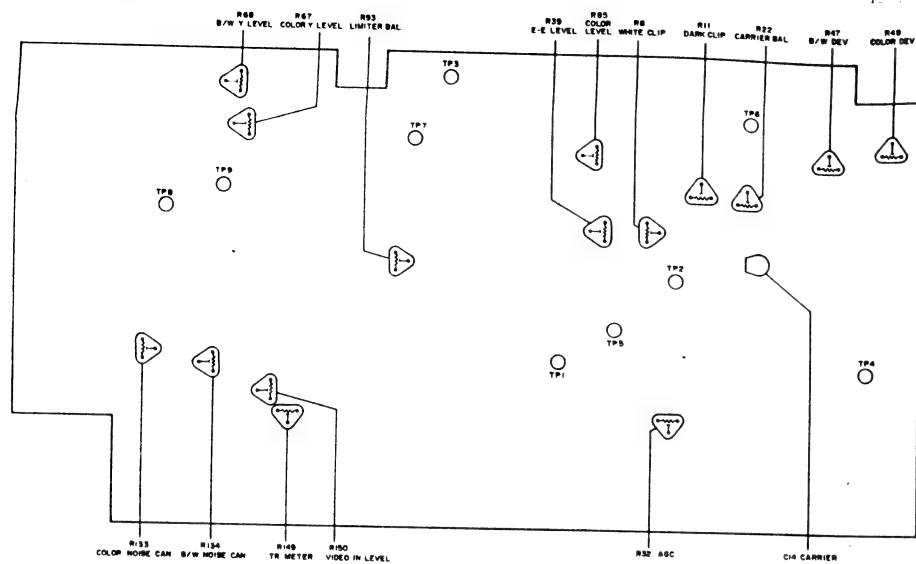


No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform								
1.	EXT. NOR. REC LEVEL VR	Normal Audio OUT AUDIO INPUT SELECT SW : SEP AUDIO METER SELECT SW : NORMAL	Normal REC LEVEL VR (Front panel)	1 kHz -6 dBs (1.1 Vp-p)	E-E	<ol style="list-style-type: none"> 1. Confirm the Normal OUT level has no load of 6.5 - 9.5 dBs (4.65 - 6.57 Vp-p) when Normal REC LEVEL VR is turned fully clockwise (↻). 2. Confirm a difference between L-CH and R-CH of within 2 dBs. 3. Turn Normal REC LEVEL VR clockwise to obtain -6 dBs (1.1 Vp-p). (↻ ADJ) <p>Note: Set output levels so that NOR. REC LEVEL VR position becomes the same to this section (3.7.1) for the following items.</p>								
2	LEVEL METER	On the Meter AUDIO INPUT SELECT SW : SEP AUDIO METER SELECT SW : NORMAL	R401 (L-CH) R402 (R-CH) [0] [1] Audio	1 kHz -6 dBs (1.1 Vp-p)	E-E	<ol style="list-style-type: none"> 1. Adjust R401 (L-CH) and R402 (R-CH) of the Audio board to read 0 dB on the level meter. 								
3	Playback Level	NORMAL (L/R) Front Service Terminal [0] [1] Audio NR SW: OFF	R3 (L-CH) R4 (R-CH) [0] [1] Audio	MH-2 1 kHz, 0 dB	P.B.	<ol style="list-style-type: none"> 1. At 1 kHz 0 dB playback, adjust R3 (L-CH P.B. LEVEL) and R4 (R-CH P.B. LEVEL) to obtain audio output levels with no load of -8 dBs (0.88 Vp-p). 								
4	P.B. Frequency Response	NORMAL (L/R) Front Service Terminal NR SW: OFF	R1 (L-CH P.B. EQ) R2 (R-CH P.B. EQ) [0] [1] Audio	MH-8 400 Hz, 100 Hz, 8 kHz -20 dB	P.B.	<ol style="list-style-type: none"> 1. Adjust R1 (L-CH) of the Audio board to obtain the frequency response shown in the Table (at 100 Hz is check only). 2. Set the 400 Hz signal for 0 dB reference level. <table border="1" data-bbox="665 1064 909 1165"> <thead> <tr> <th>Frequency</th><th>Level (dB)</th></tr> </thead> <tbody> <tr> <td>400 Hz</td><td>0 dB</td></tr> <tr> <td>100 Hz</td><td>-0.5 ± 2.0 dB</td></tr> <tr> <td>8 kHz</td><td>* 0 dB</td></tr> </tbody> </table> <ol style="list-style-type: none"> 3. In the same manner, adjust R2 (R-CH) of the Audio board. 	Frequency	Level (dB)	400 Hz	0 dB	100 Hz	-0.5 ± 2.0 dB	8 kHz	* 0 dB
Frequency	Level (dB)													
400 Hz	0 dB													
100 Hz	-0.5 ± 2.0 dB													
8 kHz	* 0 dB													
5	Bias Level	TP-5 (L-CH) TP-23 (GND) TP-6 (R-CH) TP-24 (GND) [0] [1] Audio	R9 (L-CH BIAS) R10 (R-CH BIAS) [0] [1] Audio	-	REC	<ol style="list-style-type: none"> 1. Connect an oscilloscope to TP-5/TP-23 (GND) L-CH or TP-6/TP-24 (GND) R-CH of the Audio board. 2. Adjust R9 (L-CH BIAS LEVEL) and R10 (R-CH BIAS LEVEL) of the Audio board to set the bias levels for 3.0 mVrms. 								

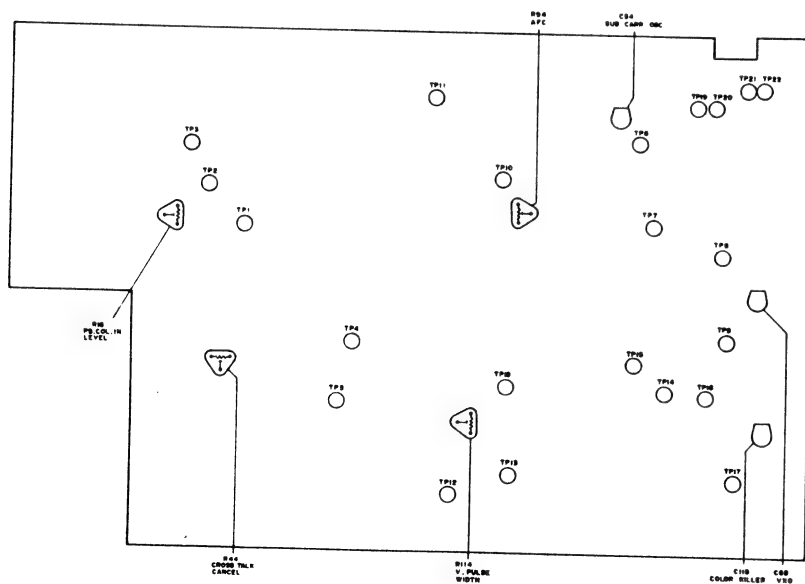
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform										
6	Audio REC Level	NORMAL (L/R) Front Service Terminal <div>AUDIO INPUT SELECT SW : SEP</div> <div>NR SW : OFF</div> <div>EXT. REC LEV VR</div> <div>ADJ.</div>	R5 (L-CH) R6 (R-CH) ① ① Audio	1 kHz -6 dBs (1.1 Vp-p) to AUDIO IN	REC ↓ P.B.	1. Adjust R5 (L-CH REC LEV) and R6 (R-CH REC LEV) to obtain audio output levels with no load of -6 dBs (1.1 Vp-p).  Note: Confirm that level difference between L-CH and R-CH within 0.5 dB.										
7	REC/P.B. Frequency Response	NORMAL (L/R) Front Service Terminal <div>AUDIO INPUT SELECT SW : SEP</div> <div>NR SW : ON</div>	R7 (L-CH) R8 (R-CH)	1 kHz 8 kHz -26.0 dBs	REC ↓ PB REC ↓ PB	1. Supply 1 kHz -6 dBs signal to AUDIO IN terminal and confirm that AUDIO OUT level is -6 dBs in E-E mode. 2. Supply 1 kHz, 8 kHz -26 dBs signals through AUDIO IN terminal to record and play back. 3. Confirm that PB level of 8 kHz signal is 0 ± 0.3 dB as 1 kHz signal level is the reference. <table border="1" data-bbox="1874 757 2107 820"><thead><tr><th>Frequency</th><th>Level (dB)</th></tr></thead><tbody><tr><td>8 kHz</td><td>0.0 ± 0.3 dB</td></tr></tbody></table> 4. If not, adjust bias level within 3.6 ± 0.5 mVrms. 5. Turn on the NR switch. 6. Record 1 kHz, 20 Hz and 100 Hz signals of -26 dBs each, and play them back. 7. Confirm that PB level of 20 Hz and 100 Hz signals are as specified below, respectively. <table border="1" data-bbox="1874 997 2107 1083"><thead><tr><th>Frequency</th><th>Level (dB)</th></tr></thead><tbody><tr><td>20 Hz</td><td>-5.0 ± 1.0 dB</td></tr><tr><td>100 Hz</td><td>0.0 ± 3.0 dB</td></tr></tbody></table> 8. Record 12 kHz -26 dBs signal and play it back to confirm that its PB level is 0 ± 2.5 dB as 1 kHz signal level is the reference. 9. If not, adjust R7 and R8 for both the channels and repeat the step 8. for confirmation of the specified values.	Frequency	Level (dB)	8 kHz	0.0 ± 0.3 dB	Frequency	Level (dB)	20 Hz	-5.0 ± 1.0 dB	100 Hz	0.0 ± 3.0 dB
Frequency	Level (dB)															
8 kHz	0.0 ± 0.3 dB															
Frequency	Level (dB)															
20 Hz	-5.0 ± 1.0 dB															
100 Hz	0.0 ± 3.0 dB															
8	Distortion	NORMAL OUT <div>AUDIO INPUT SELECT SW : SEP</div> <div>NR SW : ON</div>	—	1 kHz -2 dBs (1.56 Vp-p)	REC ↓ P.B.	1. Confirm that the distortion is less than 3.0%.										

3.8 VIDEO CIRCUIT

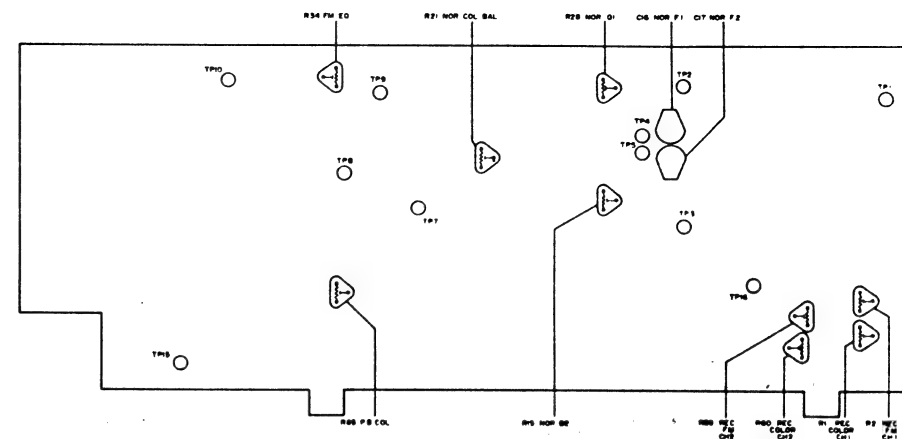
Y Amp. Board Adjustment Point (Bottom View)

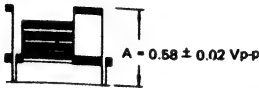
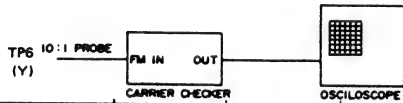
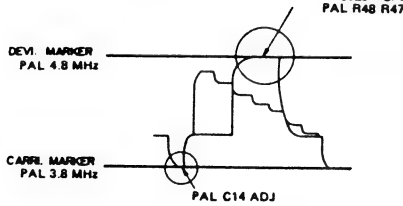



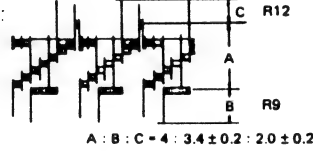
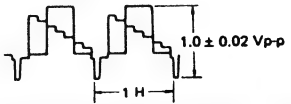
Color Board Adjustment Point (Top View)

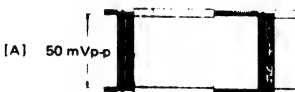

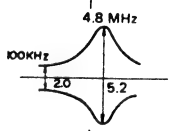



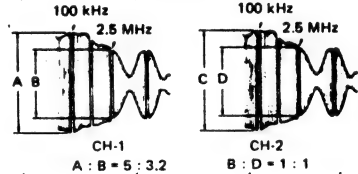
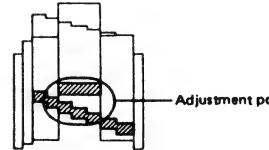
PRE/REC Board Adjustment Point (Bottom View)

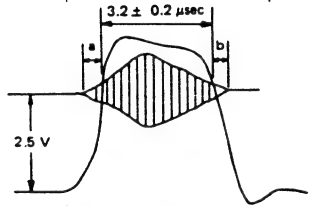
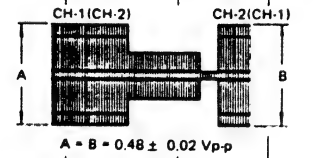



No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	AGC	TP4 11 Y Amp. AGC SW : ON	R32 (AGC LEVEL) 11 Y Amp.	Color Bar	E-E	<ol style="list-style-type: none"> 1. Supply a color bar signal to VIDEO IN. 2. Connect the oscilloscope to TP4 of Y Amp. board. 3. Adjust R32 (AGC LEVEL SET) of the Y Amp. board to obtain 0.58 ± 0.02 Vp-p. 
2	Carrier Bal.	TP6 (Y) 11 Y Amp.	R22 (CAR. BAL.) 11 Y Amp.	—	E-E	<ol style="list-style-type: none"> 1. In the E-E mode, without an input signal. 2. Connect the carrier checker and oscilloscope as shown in the figure. 3. Set the carrier checker to the NORMAL VHS mode at carrier Bal. mode. 4. Adjust R22 (CARRIER BAL.) of the Y Amp. board to minimum level. 
3	CARRIER & DEVIATION Adjustment	TP6 (Y) AGC SW : ON TP6 10:1 PROBE (Y) DEVI. MARKER PAL 4.8 MHz CARR. MARKER PAL 3.8 MHz PAL C14 ADJ	C14 (Y) R48 (Y) R47 (Y) AGC SW : ON COLOR B/W PAL R48 R47	Color Bar	E-E	<ol style="list-style-type: none"> 1. In the E-E mode input the color bars signal through the VIDEO IN terminal. 2. Connect the carrier checker and oscilloscope as shown in the figure. 3. Set the carrier checker to the NORMAL VHS mode. 4. Adjust C14 so that sync tip of the waveform coincides with the lower base line of the oscilloscope screen. 5. Adjust R48 so that white peak coincides with the upper base line of the oscilloscope screen. 6. Make a shortcircuit between TP21 and GND of the color board. 7. Adjust R47 so that white peak coincides with the oscilloscope's upper base line. 8. Disconnect the shorting wire between TP21 and GND. <p>Note: For the measurement, use a probe of 10 : 1 ratio.</p> 
4	AFC	TP-10 10 Color	R94 (AFC) 10 Color	Color Bar	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Connect a video monitor to the VIDEO OUT terminal. 2. Record the color bars signal and play it back. 3. Connect a digital voltmeter to TP10 of the COLOR board. 4. Adjust R94 of the COLOR board so that signal level at TP10 is 4.40 ± 0.05 V DC in the range of normal color reproduction on the video monitor.

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
5	VXO	TP-8 10 Color	C68 (VXO) TP-7 10 Color	Color Bar	E-E	<ol style="list-style-type: none"> 1. Supply a color bar input signal to VIDEO IN. 2. Connect a jumper wire between TP-7 of the Color board and GND. 3. Connect a frequency counter to TP8 of the Color board. 4. Adjust C68 (VXO) of the Color board to obtain $4.43571 \text{ MHz} \pm 30 \text{ Hz}$. <p>Note: For the measurement, use a probe of 10 : 1 ratio.</p>
6	E-E Y Level	TP-8 11 Y Amp.	R39 (E-E LEVEL) 11 Y Amp.	Color Bar	E-E	<ol style="list-style-type: none"> 1. Supply a color bar input signal to VIDEO IN. 2. With load at 75-ohm, connect the oscilloscope to TP-8 (VIDEO OUT) of the Y Amp. board. 3. Adjust R39 (E-E LEVEL) of the Y Amp. board to obtain 1.0 ± 0.02 Vp-p. 
7	White and Dark Clip	TP-2 11 Y Amp.	R8 (WHITE CLIP) R11 (DARK CLIP) 11 Y Amp.	Color Bar	E-E	<ol style="list-style-type: none"> 1. Supply a color bar signal to VIDEO IN. 2. Connect the oscilloscope to TP-2 of the Y Amp. board. 3. As shown in the Figure adjust R8 (WHITE CLIP) and R11 (DARK CLIP). 
8	P.B. Y Level	VIDEO OUT (TP5) 11 Y Amp.	R68 (P.B. Y LEVEL) 11 Y Amp.	Color Bar	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Supply a color bar signal to VIDEO IN. 2. With load at 75Ω, connect the oscilloscope to VIDEO OUT (TP5) of the Y Amp. board. 3. Connect a jumper wire between TP21 of the color board and GND. 4. Adjust R68 (P.B. Y LEVEL) of the Y. Amp. board to obtain 1.0 ± 0.02 Vp-p. 
9	V. Pulse Width	TP-13 10 Color	R114 10 Color	MH-2 Color Bar	P.B.	<ol style="list-style-type: none"> 1. Connect the oscilloscope's probe to TP13 of the COLOR board. 2. Play back the alignment tape MH-2 and confirm that the pulse duration meets the following specifications. $T = 580 \pm 20 \mu\text{sec.}$ 3. If not, adjust R114 of the COLOR board to obtain the specified value.

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform												
10	REC FM Level	TP-2 (CH-1) TP-3 (CH-2) 0.9 Pre/Rec. D. PULSE Front Service Terminal TP-7 0.2 FM Audio	R2 (CH-1 REC FM) R59 (CH-2 REC FM) 0.9 Pre/Rec.	Color Bar	REC REC ↓ P.B. REC REC ↓ P.B. REC ↓ P.B.	<ol style="list-style-type: none">1. Supply a color bar signal to VIDEO IN.2. Connect an oscilloscope to TP-2 (CH-1) and TP-3 (CH-2) of the Pre/Rec. board and trigger the oscilloscope externally with the signal from D. PULSE terminal.3. Adjust R2 (CH-1 REC FM LEV.) and R59 (CH-2 REC FM LEV.) to obtain 50 mVp-p.4. Connect an oscilloscope to TP7 of the FM audio board and record then play back. Confirm the TP7 (CH-1/CH-2) level is more than 76 mVp-p (trigger : - slope CH-1, + slope CH-2).5. If TP7 level is less than 76 mVp-p, readjust R2 or R59.<ul style="list-style-type: none">• When CH-1 level is less than 76 mVp-p, readjust R59 (CH-2 REC FM LEV.) to obtain 45 mVp-p.• When CH-2 level is less than 76 mVp-p, readjust R2 (CH-1 REC FM LEV.) to obtain 45 mVp-p.6. Confirm the TP7 level is more than 76 mVp-p.7. If TP7 level is less than 76 mVp-p, readjust R2 and R59 to obtain 40 mVp-p in the same manner as above step 5.8. Confirm the TP7 level is more than 76 mVp-p.												
		 <p>(A) 50 mVp-p</p>  <p>(B) 76 mVp-p</p>																
11	Video Head Resonance and Q (Quality Factor) (Using signal generator)	TP8 (PRE/REC) SWEEP IN TP2 (CH-1) TP3 (CH-2)	C16 (PRE/REC) C17 (PRE/REC) R28 (PRE/REC) R15 (PRE/REC)		P.B.	<ol style="list-style-type: none">1. Connect the oscilloscope to TP8 of the PRE/REC board.2. Connect a sweep generator to TP2 (CH-1) of the PRE/REC board to supply sweep signal through it.3. Set the deck with a blank tape. Set for Play mode.4. Adjust C16 so that Fo is 4.8 MHz.5. Set the oscilloscope so that 100 kHz signal level is 2 scale divisions on the screen, and adjust R28 to obtain 5.2 scale divisions for Q of 4.8 MHz signal.6. For CH-2, connect the sweep generator to TP3 (CH-2) and perform the same adjustment as mentioned above for CH-1. <p>Notes:</p> <p>Adjustment of this item, is required after replacement of the drum ass'y and upper drum ass'y.</p> <p>Adjust output level of the sweep generator to be 0.25 Vp-p approx. at TP8 with 1 MHz signal.</p> <p>If trigger output is available from the sweep generator, supply the trigger pulse to the oscilloscope for adjustment.</p>												
		 <p>4.8 MHz</p> <p>100kHz</p> <p>2.0 5.2</p>																
						<table><tr><th></th><th>Sig. IN</th><th>Fo</th><th>Q</th></tr><tr><td>CH-1</td><td>TP2</td><td>C16</td><td>R28</td></tr><tr><td>CH-2</td><td>TP3</td><td>C17</td><td>R15</td></tr></table>		Sig. IN	Fo	Q	CH-1	TP2	C16	R28	CH-2	TP3	C17	R15
	Sig. IN	Fo	Q															
CH-1	TP2	C16	R28															
CH-2	TP3	C17	R15															

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
12	P.B. Color Channel Balance and Level	TP-15 0.9 Pre/Rec. D. PULSE Front Service Terminal	R21 (NOR COL. BAL.) R85 (P.B. COL.) 0.9 Pre/Rec.	MH-2 Color Bar	P.B.	<ol style="list-style-type: none"> 1. Play JVC Alignment tape MH-2 color signal. 2. Connect the oscilloscope to TP-15 of the Pre/Rec. board. 3. Trigger the oscilloscope externally with the signal from D. PULSE terminal. 4. Adjust R21 (NOR COLOR BAL) of the Pre/Rec. board to align the CH-1 and CH-2 levels. 5. Adjust R85 (P.B. LEVEL) of the Pre/Rec. board for a waveform level of 0.5 Vp-p. 6. Connect the oscilloscope to TP-2 of the Color board. 7. Adjust R18 (P.B. COL IN LEV.) of the Color board for a waveform level of 0.2 Vp-p.
						 <p>A = B = 0.5 Vp-p</p> <p>TP-2 1.0 Color</p> <p>R18 (P.B. COL IN LEV.) 1.0 Color</p>
13	P.B. FM Equalizer Channel Balance and level	TP-7, TP-10 0.9 Pre/Rec.	R34 (FM EQ) L10 0.9 Pre/Rec.		P.B.	<ol style="list-style-type: none"> 1. Supply a sweep signal of approx. 0.5 Vp-p to TP-7 and connect an oscilloscope to TP-10. 2. Adjust R34 (FM EQ) to obtain maximum Q at TP-10. (Fo = 4.2 ± 0.1 MHz) 3. Confirm resonance frequency differs, adjust by L10.
		VIDEO OUT Both ends 75 Ω load D. PULSE Front Service Terminal	R34 (FM EQ) R28 (NOR Q1) R15 (NOR Q2) 0.9 Pre/Rec.	Color sweep	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Supply a color sweep signal to VIDEO IN, record and play back. 2. With load at 75 Ω, connect oscilloscope to the VIDEO OUT. 3. Trigger the oscilloscope externally (- slope CH-1, + slope CH-2) with the signal from D. PULSE of the Front Service terminal. 4. If the 2.5 MHz levels of CH-1 and CH-2 differ, adjust the higher level channel to match the lower by using R28 (NOR Q1) for CH-1 and R15 (NOR Q2) for CH-2. 5. Use the controls of the oscilloscope to position the 100 kHz region at scale graduation 5 of the oscilloscope screen. Adjust R34 (FM EQ) of Pre/Rec. board to position the 2.5 MHz portion at 3.2 (-4.0 dB) of the oscilloscope graduations.
						 <p>100 kHz 2.5 MHz</p> <p>CH-1 A : B = 5 : 3.2</p> <p>CH-2 B : D = 1 : 1</p>
14	Limiter Balance	TP-7 1.1 Y Amp. D. PULSE Front Service Terminal	R93 (LIMITER BAL.) 1.1 Y Amp.	Color Bar	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Supply a color bar signal to VIDEO IN, record and play back. 2. Connect the oscilloscope to TP-7 of the Y Amp. board. 3. Trigger the oscilloscope externally with the signal from D. PULSE terminal. 4. Adjust R93 (LIMITER BAL.) of the Y Amp. board so that the double line become minimum carrier signal leakage at waveform as shown below.
						 <p>1.1 Vp-p</p> <p>Adjustment point</p>

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
15	P.B. 4.43 MHz (Sub. Carrier Osc.)	TP-6 1 0 Color	C54 (4.43 MHz OSC.) 1 0 Color	Color Bar	REC	<ol style="list-style-type: none"> 1. Supply a color bar signal to VIDEO IN. 2. Connect a frequency counter to TP-6 of the Color board. 3. Adjust C54 of the Color board to obtain 4.433619 MHz \pm 15 Hz.
16	Burst Gate Pulse	TP-4 TP-11 1 0 Color	L17 L19 1 0 Color	Color Bar	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Supply a color bar input signal to VIDEO IN, record then playback. 2. Connect a dual trace oscilloscope to TP-4 and TP-11 of the Color board. 3. Adjust in the core of L19 and confirm the burst gate pulse width of $3.2 \pm 0.2 \mu\text{sec}$ at DC voltage of 2.5 V. 4. Adjust L17 to position the burst gate pulse signal to the center of the burst signal at DC voltage of 2.5 V. (i.e. set to obtain a=b) <p>Note: Treat L19 coil carefully as easily broken.</p> 
17	Rec. Color Channel Balance and Level	TP-15 0 9 Pre/Rec. D. PULSE Front Service Terminal	R1 (CH-1 REC COL.) R60 (CH-2 REC COL.) 0 9 Pre/Rec.	Color Bar	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Supply a color bar signal to VIDEO IN, record then playback. 2. Connect the oscilloscope to TP-6 of the Pre/Rec. board. 3. Trigger the oscilloscope externally (— slope CH-1, + slope CH-2) with the signal from D. PULSE of the Front Service terminal. 4. Adjust R1 (CH-1 REC COL.) for CH-1 and R60 (CH-2 REC COL.) for CH-2 to obtain output level of $0.48 \pm 0.02 \text{ Vp-p}$. 
18	P.B. Color Level	TP-5 1 1 Y Amp.	R67 (COL. Y LEV.) R85 (COLOR LEV.) 1 1 Y Amp.	Color Bar	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Supply a color bar input signal to VIDEO IN, record then playback. 2. With load at 75 Ω, connect the oscilloscope to TP-5 of the Y Amp. board. 3. Adjust R67 (COL. Y LEV.) of the Y Amp. board to obtain $1.00 \pm 0.02 \text{ Vp-p}$. 4. Adjust R85 (COLOR LEV.) of the Y Amp. board for $0.28 \pm 0.01 \text{ Vp-p}$ of burst signal. 

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
19	Color Killer	TP-16 1 0 Color	C118 (COL. KILLER) 1 0 Color	—	E-E	<ol style="list-style-type: none"> 1. Connect jumper wires between TP-14, TP-15 and GND of the Color board. 2. Connect a frequency counter to TP-16 of the Color board and adjust C118 (COL. KILLER) of the Color board to obtain 4.433619 MHz \pm 50 kHz.
20	COMB. Filter ADJ.	VIDEO OUT Monitor TV (75 termination)	R44 (CROSS TALK CAN.) L7 1 0 Color	Color bar	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Supply a color bar input signal to VIDEO IN, record then playback. 2. Turn the tracking control VR and set for the bar noise becomes located in the most visible position on a monitor display. 3. Adjust R44 (CROSS TALK CAN.) of the Color board for absence of 2H bar noise in the reproduced picture. 4. If not absence of 2H bar noise, alternately adjust L7 and R44 (CROSS TALK CAN.) of the Color board for absence of 2H bar noise.
21	Noise Cancel	TP-9 1 1 Y Amp.	R133 (COL. NOISE CAN.) R134 (B/W NOISE CAN.) 1 1 Y Amp.	Color Bar	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Connect a 0.022 F ceramic capacitor between TP-9 of the Y Amp. board and GND. 2. Connect oscilloscope to TP-9 of the Y Amp. board. 3. Adjust R133 (COL. NOISE CAN.) of the Y Amp. board to minimize the waveform. 4. Connect a 0.022F capacitor between TP21 of the COLOR board and GND. 5. Record then playback. 6. Adjust R134 (B/W NOISE CAN.) of the Y Amp. board to minimize the waveform.
22	Tracking Meter	On the Meter	R149 (TR. METER) 1 1 Y Amp.	Color Bar	REC ↓ P.B.	<ol style="list-style-type: none"> 1. Supply a color bar input signal to VIDEO IN, record then playback. 2. Turn the tracking control and set it at the center click position. 3. Adjust R149 to read 3.5 on the tracking meter.
23	Video Level Meter	Video Level Meter VIDEO AGC SW : ON	R150 (V. LEV. METER) 1 1 Y Amp.	Color Bar	E-E	<ol style="list-style-type: none"> 1. Supply a color input signal to VIDEO IN. 2. Adjust R150 to get a video meter needle position of the center of the green zone of the meter.

SECTION 4 CHARTS AND DIAGRAMS

4.1 KEY TO ABBREVIATIONS

A	ACC	: Automatic Color Control
	ADD	: Adder
	ADC	: Analog to Digital Converter
	ADJ	: Adjustment
	A DUB	: Audio Dubbing
	AE	: Audio Erase
	AEF	: Automatic Edition Function
	AFC	: Automatic Frequency Control
	AFT	: Automatic Fine Tuning
	AGC	: Automatic Gain Control
	AH	: Audio Head
	AL	: After Loading
	ALC	: Automatic Level Control
	ALM	: Alarm
	AM	: Amplitude Modulation
	AMP	: Amplifier
	ANT	: Antenna
	APC	: Automatic Phase Control
	APL	: Average Picture Level
	ASSEM	: Assembly
	ASS'Y	: Assembly
	ATT	: Attenuator
	AUTO	: Automatic
	AUX	: Auxiliary
	AUD	: Audio

B	B	: Brake
	BAL	: Balance
	BATT	: Battery
	BCD	: Binary Coded Decimal
	BEG	: Beginning
	BFP	: Burst Flag Pulse
	BIT	: Binary Digit
	BLK	: Black
	BLU	: Blue
	BNC	: Bayonet connector
	BPF	: Bandpass Filter
	BRN	: Brown
	BRT	: Brightness
	B SOL	: Brake Solenoid
	B/W	: Black and White

C	C	: Ceramic
	CAP	: Capstan
	CASS	: Cassette
	CF	: Ceramic Filter, color Frame
	CC	: Cassette compartment
	CE	: Chip Enable
	CH	: Channel
	CHROMA	: Chrominance
	CLK	: Clock
	CLR	: Clear
	CMD	: Command
	CNT	: Count, Counter
	CONV	: Converter
	COL	: Color
	COM	: Common

COMP	: Comparator
	: Composite
	: Compensation
CONN	: Connector
CT	: Ceramic Trap
CTC	: Crosstalk Cancel
CTL	: Control

D	D	: Drum
	DAC	: Digital to Analog Converter
	DD	: Direct Drive
	DEC	: Decoder
	DEMOD	: Demodulator
	DET	: Detector
	DEV	: Deviation
	DFRS	: Drum Free RUN STOP
	DIF TRANS	: Differential Transformer
	DISCR	: Discriminator
	DL	: Delay Line
	DOC	: Dropout Compensator
	DRUM FF	: Drum Flip Flop
	DUB	: Dubbing

E	E	: Edit, Erase
	EDP	: Electronic Data Processing
	E-E	: Electric to Electric
	EF	: Emitter-Follower
	EMPHA	: Emphasis
	EMG	: Emergency
	ENC	: Encoder
	EN	: Enable
	EQ	: Equalizer
	ESNS	: End Sensor
	EXP	: Expander
	EXT	: External

F	FE	: Full Erase
	FF	: Fast Forward
		: Flipflop
	FG	: Frequency Generator
	FM	: Frequency Modulation
	FMA	: FM Audio
	FREQ	: Frequency
	F-V CONV	: Frequency to Voltage Converter
	FWD	: Forward

G	GDL	: Grass Delay Line
	GEN LOCK	: Generator Lock
	GND	: Ground
	GRN	: Green
	GRY	: Gray

H	H	: High, Horizontal
	HG	: Hall Generator
	HPF	: Highpass Filter

I	IF	: Intermediate Frequency
	IFT	: Intermediate Frequency Transformer
	IND	: Indicator
	INH	: Inhibit
	INS	: Insert

INT	: Internal, Interrupt
INV	: Inverter
I/O	: Input/Output

L	L	: Low
	LB	: Low Band
	LCD	: Liquid Crystal Display
	LE	: Loading End
	LED	: Light Emitting Diode
	LIN	: Linearity
	LIM	: Limiter
	LOAD	: Loading
	LP	: Long Play
	LPF	: Lowpass Filter
	LT	: Loading Tension

M	MAX	: Maximum
	MDA	: Motor Drive Amplifier
	MIC	: Microphone
	MIN	: Minimum
	MIX	: Mixer
	MM	: Monostable Multivibrator
	MOD	: Modulator
	MON	: Monitor
	MOS	: Metal Oxide Semiconductor
	MPX	: Multiplexer
	MS	: Mode Select
	MUT	: Muting

N	NC	: Noise Cancel
	NFB	: Negative Feedback
	NO	: Normally Open

O	OPAMP	: Operational Amplifier
	OP	: Operation
	ORN	: Orange
	OSC	: Oscillator

P	PB	: Playback
	PC	: Photocoupler
	PCM	: Pulse Code Modulation
	PGM	: Program
	PG	: Pulse Generator
	PI	: Photo Interrupter
	PLL	: Phase Locked Loop
	POS	: Position
	PR	: Pinch Roller
	PREV	: Preview
	PRL	: Preroll
	PU	: Pickup
	PWB	: Printed Wiring Board

Q	Q	: Quality Factor
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R	RA	: Resistor Array
		: Random Access
	RAM	: Random Access Memory
	REC	: Recording
	REG	: Regulated
	REV	: Reverse
	REW	: Rewind
	RF	: Radio Frequency

RST	: Reset
R/P	: Record/Playback
RPT	: Repeat
RT	: Rotary Transformer
RY	: Relay

S	S	: Search, Servo
	SC	: Subcarrier
	SEAR	: Search
	SEL	: Select
	SENS	: Sensor
	SEP	: Separator
	SF	: Source Follower
	SFF	: Short Fast Forward
	SFWD	: Search Forward
	SI	: Serial In
	SIG	: Signal
	SO	: Serial Out
	SOL	: Solenoid
	SOS	: Sound on Sound
	SP	: Standard Play
	SR	: Supply Reel
	SREV	: Search Reverse
	SREW	: Short Rewind
	SSG	: Sync Signal Generator
	STL	: Still
	SUP	: Supply
	SYNC	: Synchronization
	SYSCON	: System control

T	TBC	: Time Base Corrector
	TC	: Tension Control, Time Code
	TDG	: Time Date Generator
	T EALM	: Tape End Alarm
	TEN	: Tension
	TIM	: Timing
	TK	: Tracking
	TL	: Time Lapse
	TREC	: Timer Record
	TSW	: Time Switch
	TU	: Take-up
	TUR	: Take-up Reel

U	UNLD	: Unloading
	UNREG	: Unregulated
	UNSW	: Unswitched

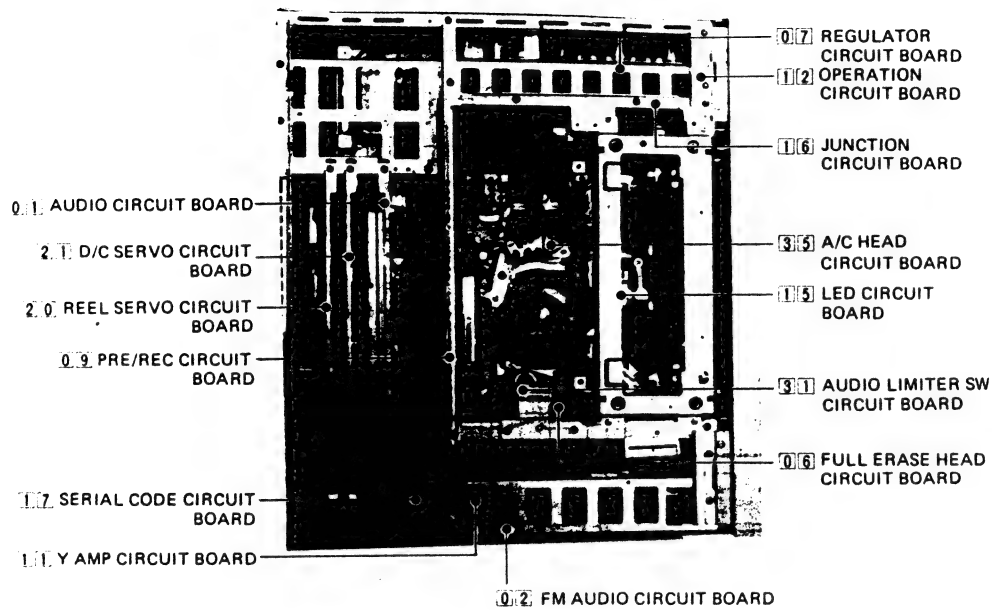
V	V	: Video, Vertical
	VCO	: Voltage Controlled Oscillator
	VD	: Vertical Drive
	VXO	: Variable Crystal Oscillator
	VLT	: Violet
	VSCH	: Variable Search

W	WHT	: White
	WV	: Working Voltage
	WARN	: Warning

X	XTL	: Crystal
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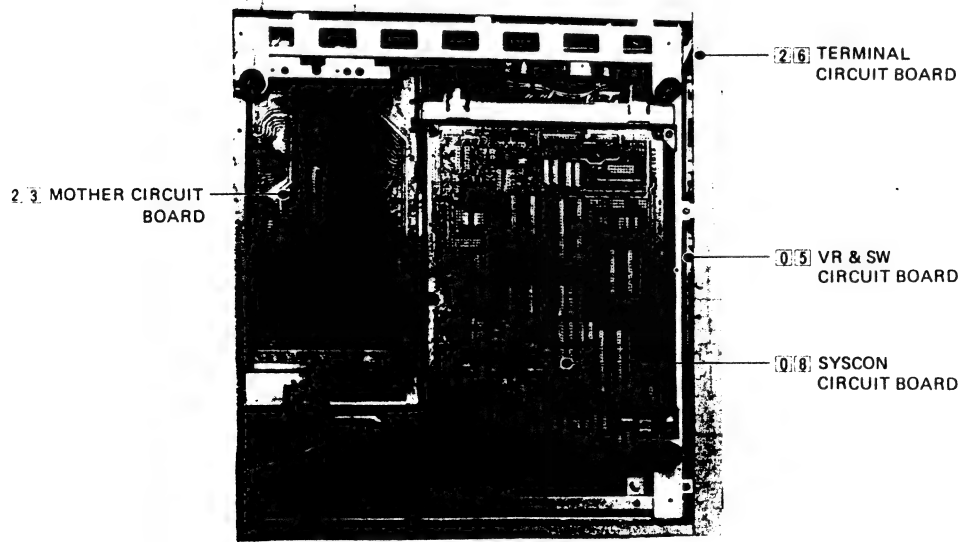
Y	Y	: Luminance
	YLW	: Yellow

4.2 ELECTRICAL PARTS LOCATION

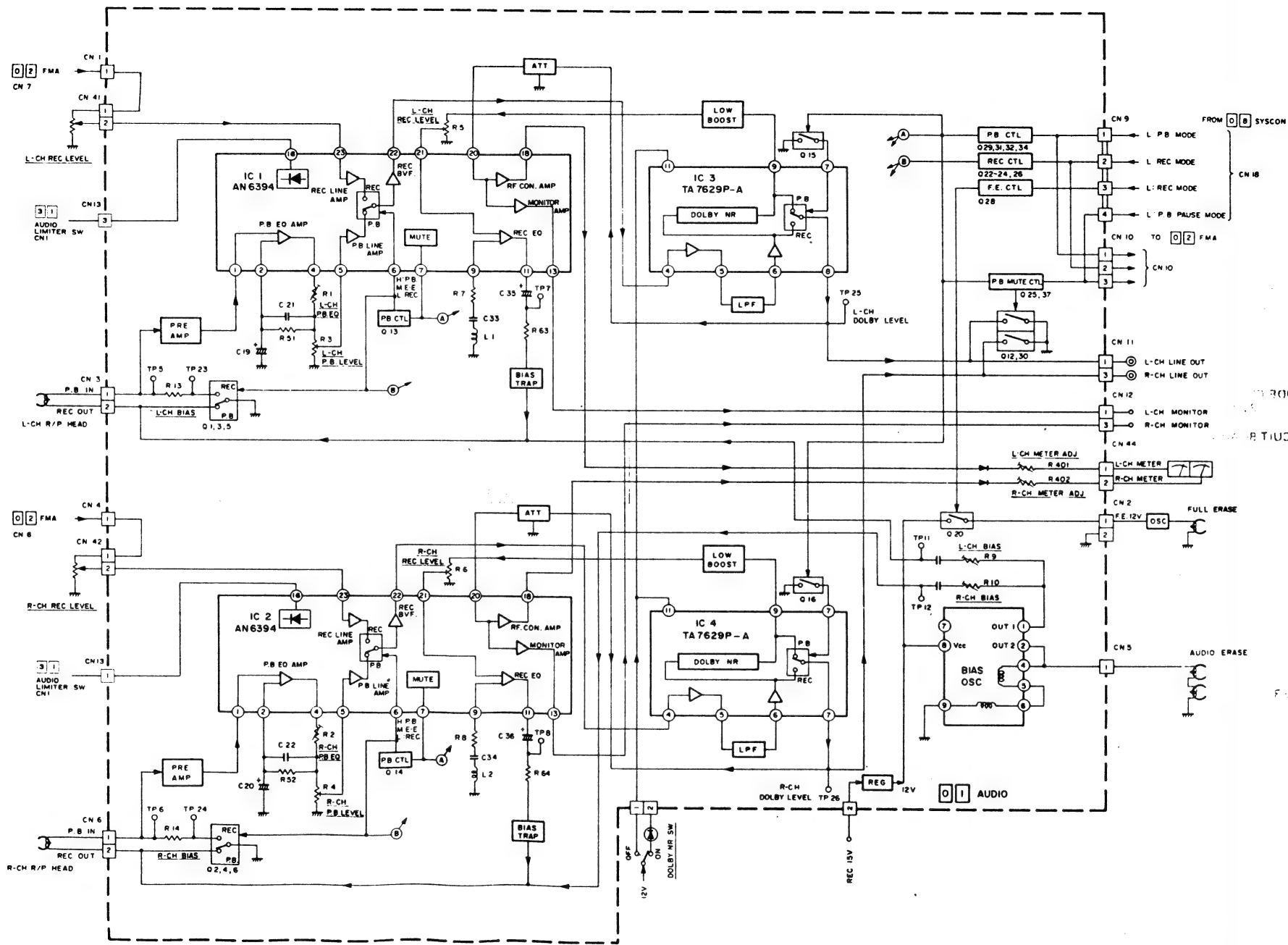


— INDEX OF CHARTS, DIAGRAMS AND PARTS LIST —

No.	CIRCUIT BOARD NAME	Block diagram page	Schematic diagram page	Circuit board page	Parts list page
0.1	AUDIO	4-4	4-12	4-13	6-6
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0.3	REAR-1	—	4-38	4-34	6-12
0.4	REAR-2	—	4-38	4-34	6-12
0.5	VR & SW	—	4-38	4-34	6-12
0.6	FULL ERASE HEAD	—	4-38	4-36	6-12
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0.8	SYSTEM CONTROL	4-11	4-18	4-19	6-13
0.9	PRE/REC	4-6	4-20	4-21	6-15
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1.6	JUNCTION	—	4-26	4-27	6-24
1.7	SERIAL CODE	—	4-28	4-29	6-24
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2.3	MOTHER	—	—	4-37	6-28
2.4	FRONT LED	—	4-39	4-35	6-28
2.5	REC LED	—	4-39	4-35	6-28
2.6	TERMINAL	—	4-38	4-35	6-28
2.7	LD/UNLD SW	—	—	4-36	—
3.1	AUDIO LIMITER SW	—	4-38	4-36	6-28
3.5	A/C HEAD	—	4-38	4-36	6-28
4.1	POWER TRANSISTOR	—	4-16	4-17	6-28



4.3 AUDIO BLOCK DIAGRAM



A

B

C

AUDIO BLOCK 4.4

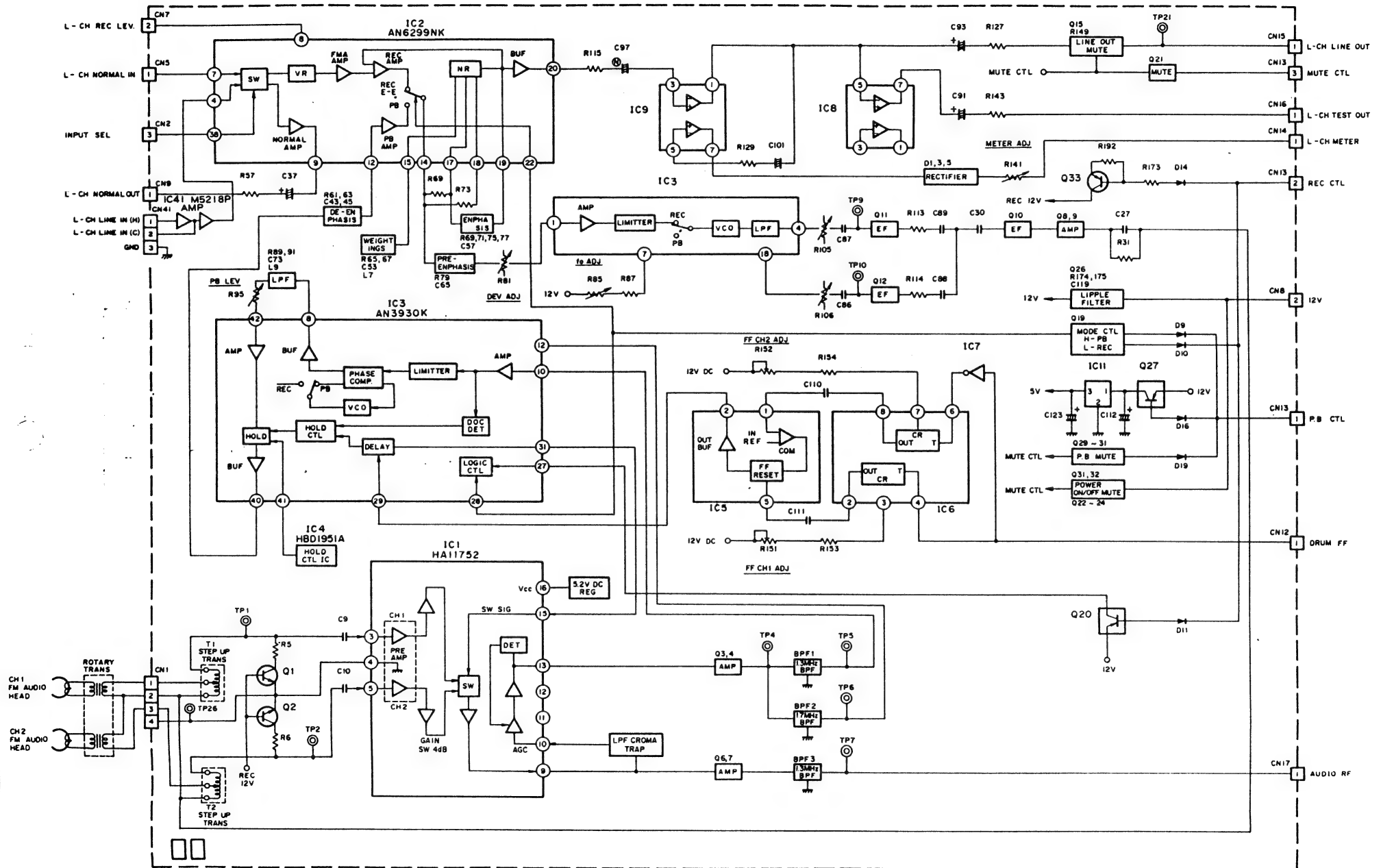
4.4 AUDIO BLOCK

F

G

H

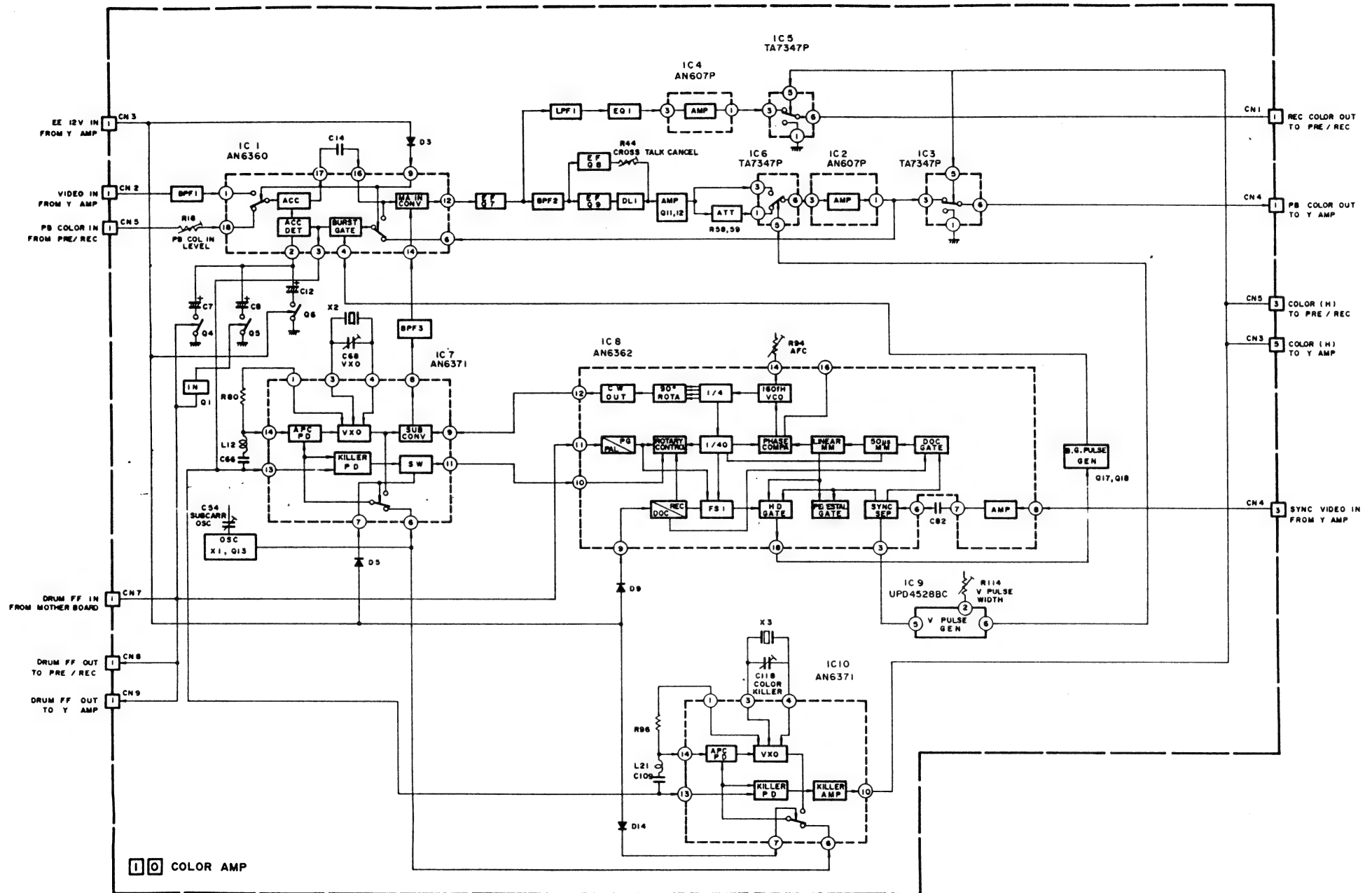
4.4 FM AUDIO BLOCK DIAGRAM



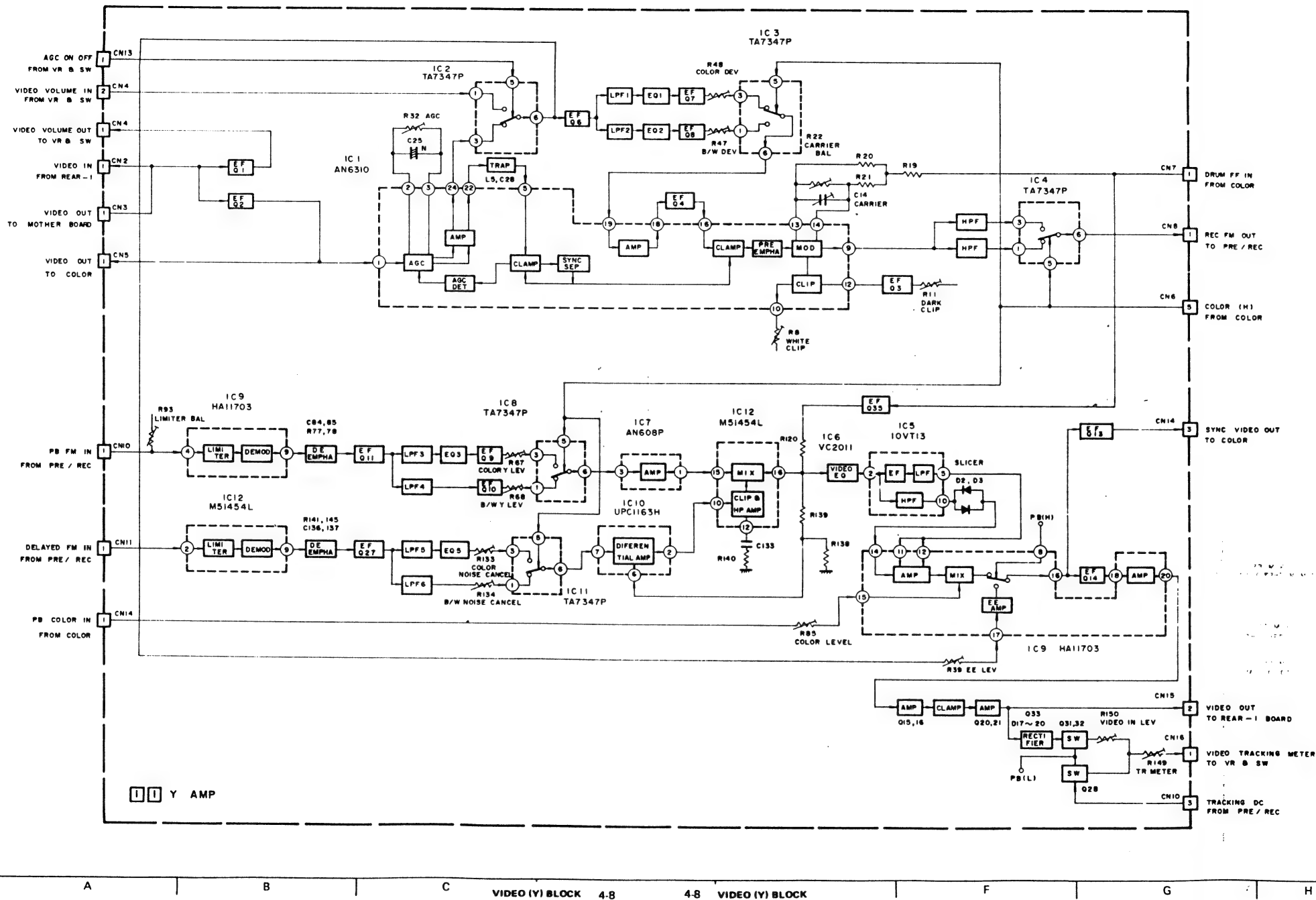
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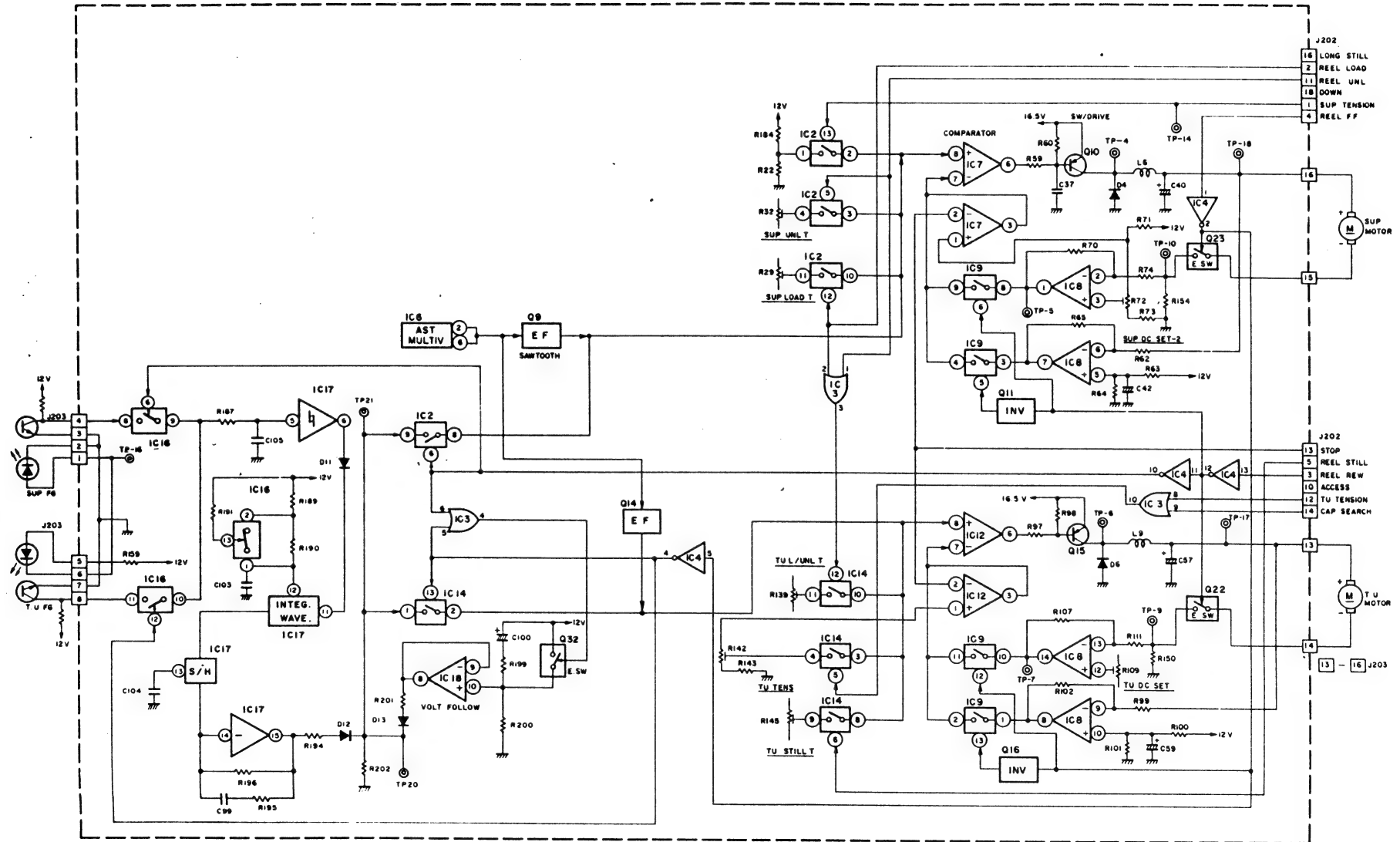
4.6 VIDEO SECTION BLOCK DIAGRAM (COLOR)



4.7 VIDEO SECTION BLOCK DIAGRAM (Y AMP)

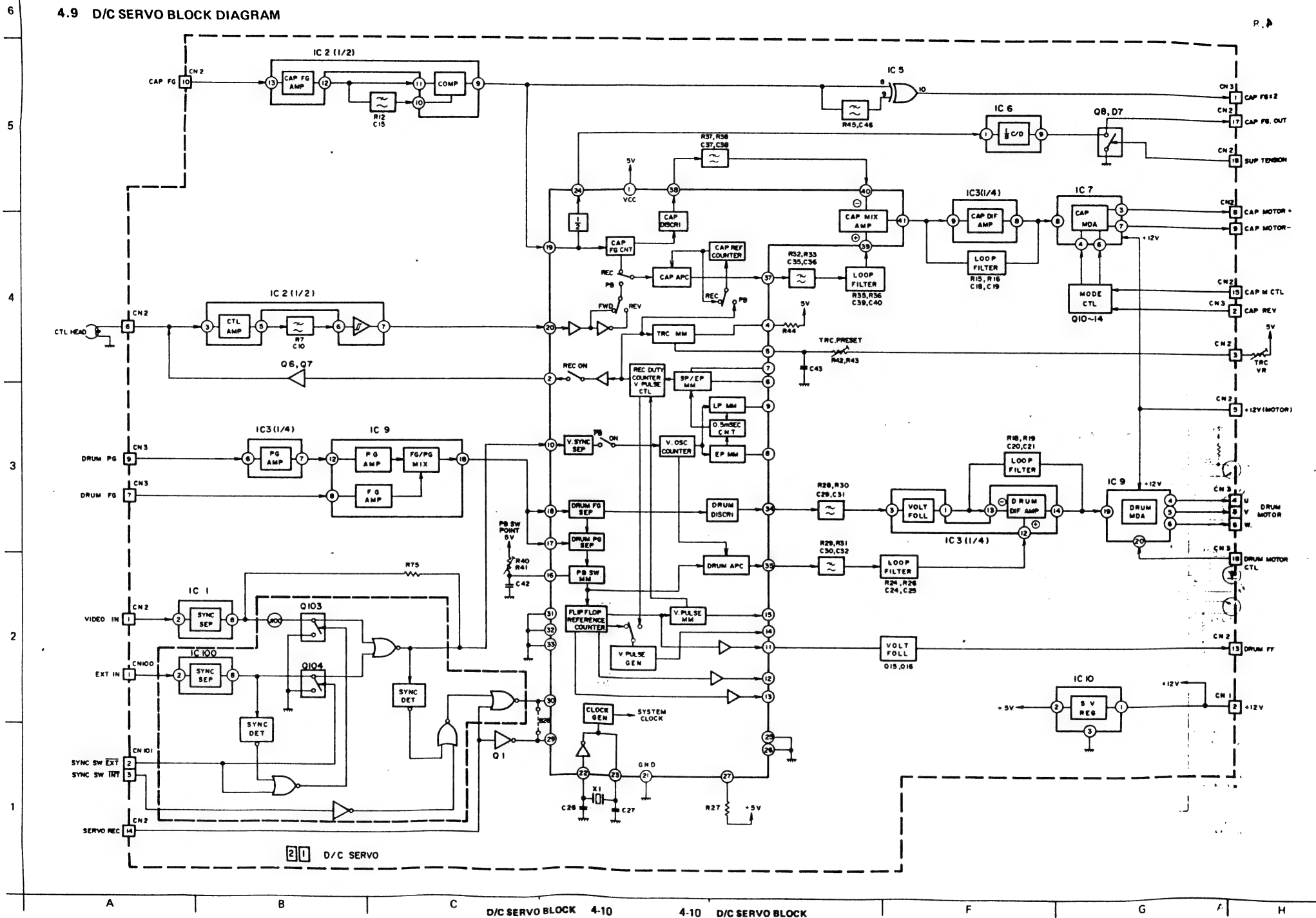


4.8 REEL SERVO BLOCK DIAGRAM

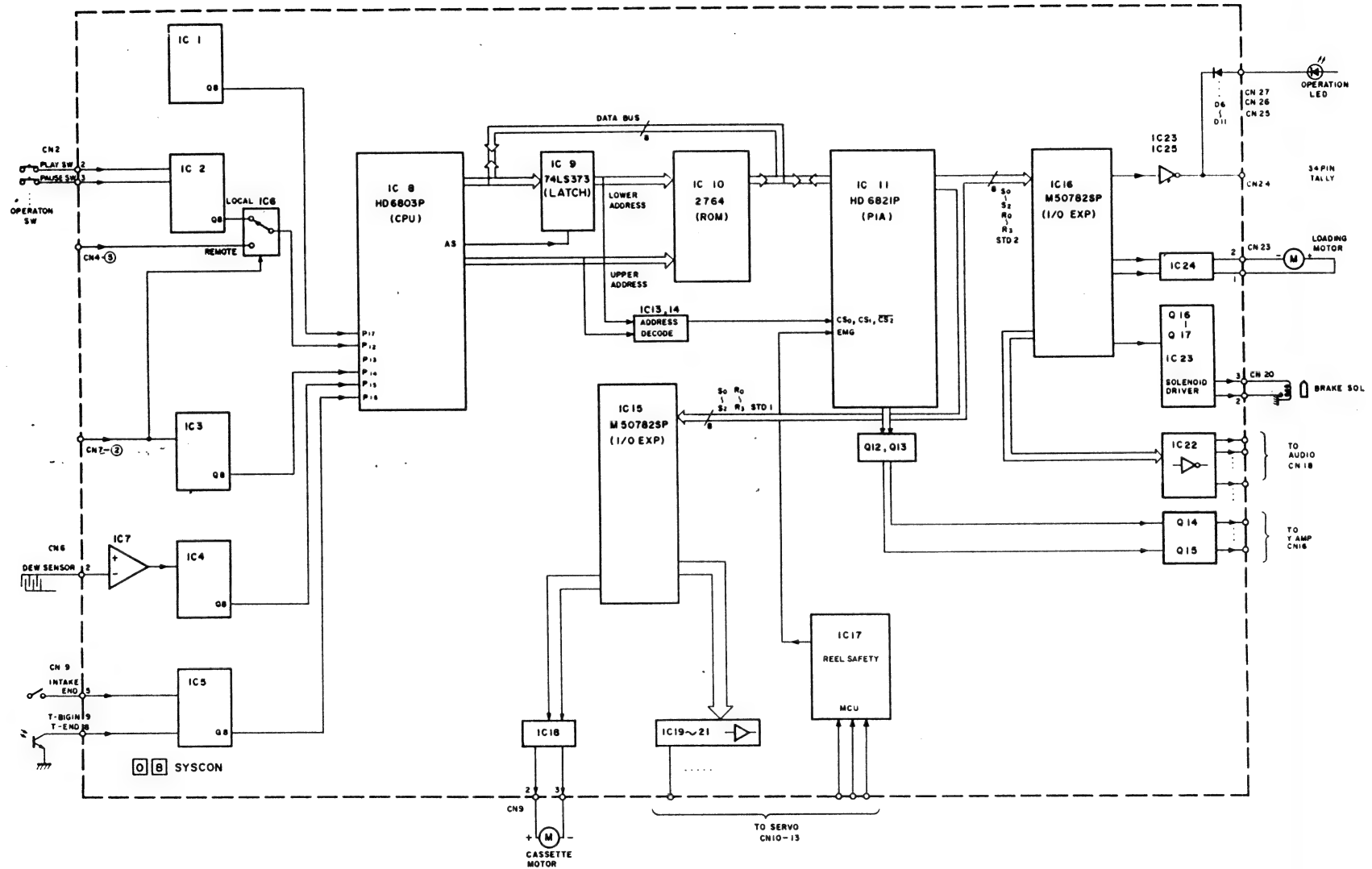


4.9 D/C SERVO BLOCK DIAGRAM

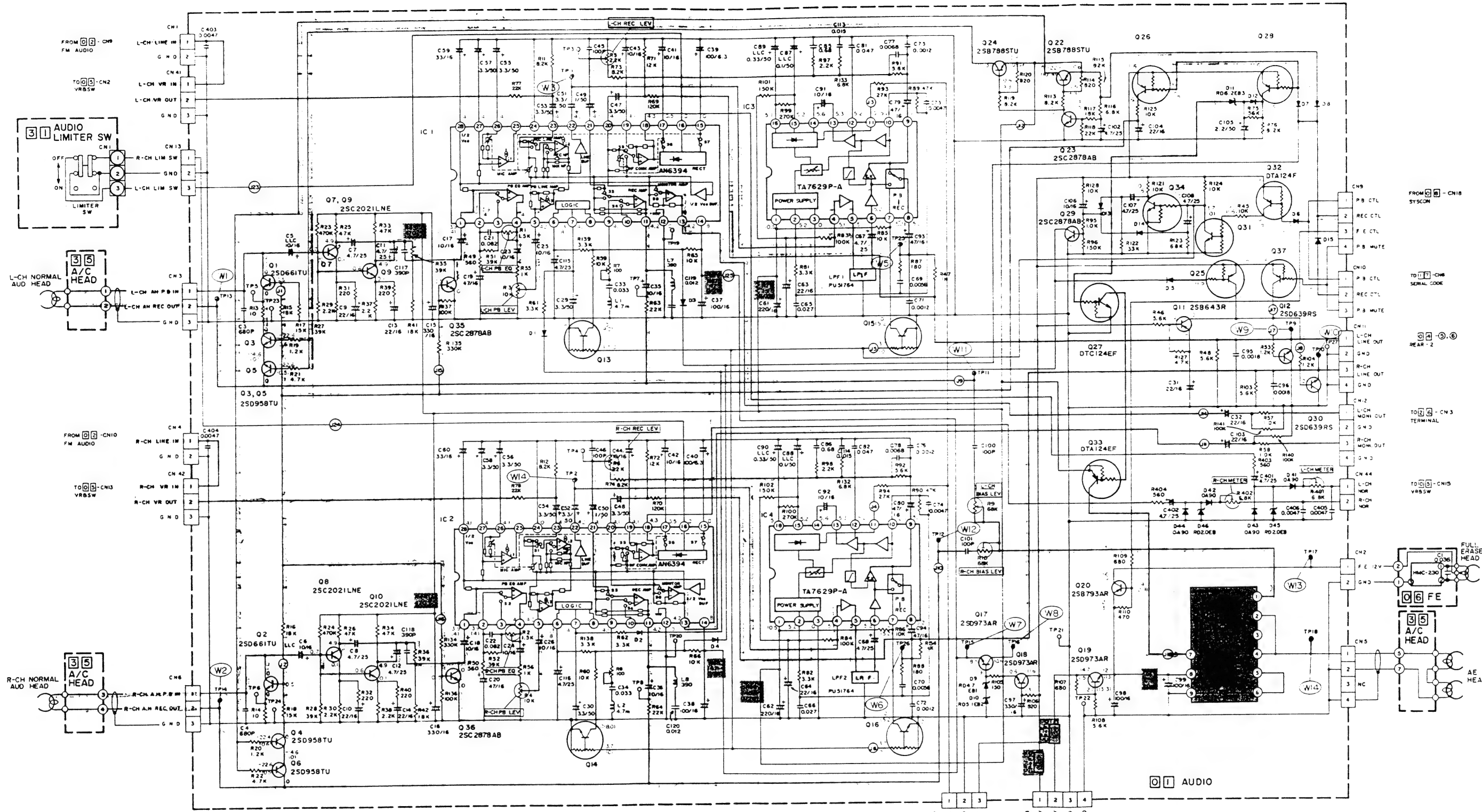
P. 3



4.10 SYSTEM CONTROL BLOCK DIAGRAM

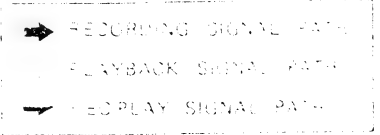
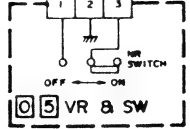


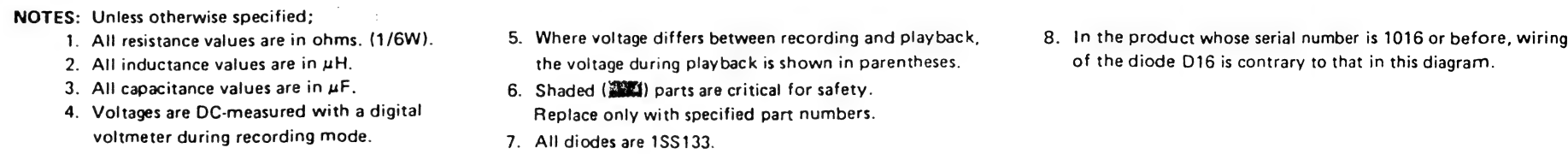
4.11 AUDIO SCHEMATIC DIAGRAM



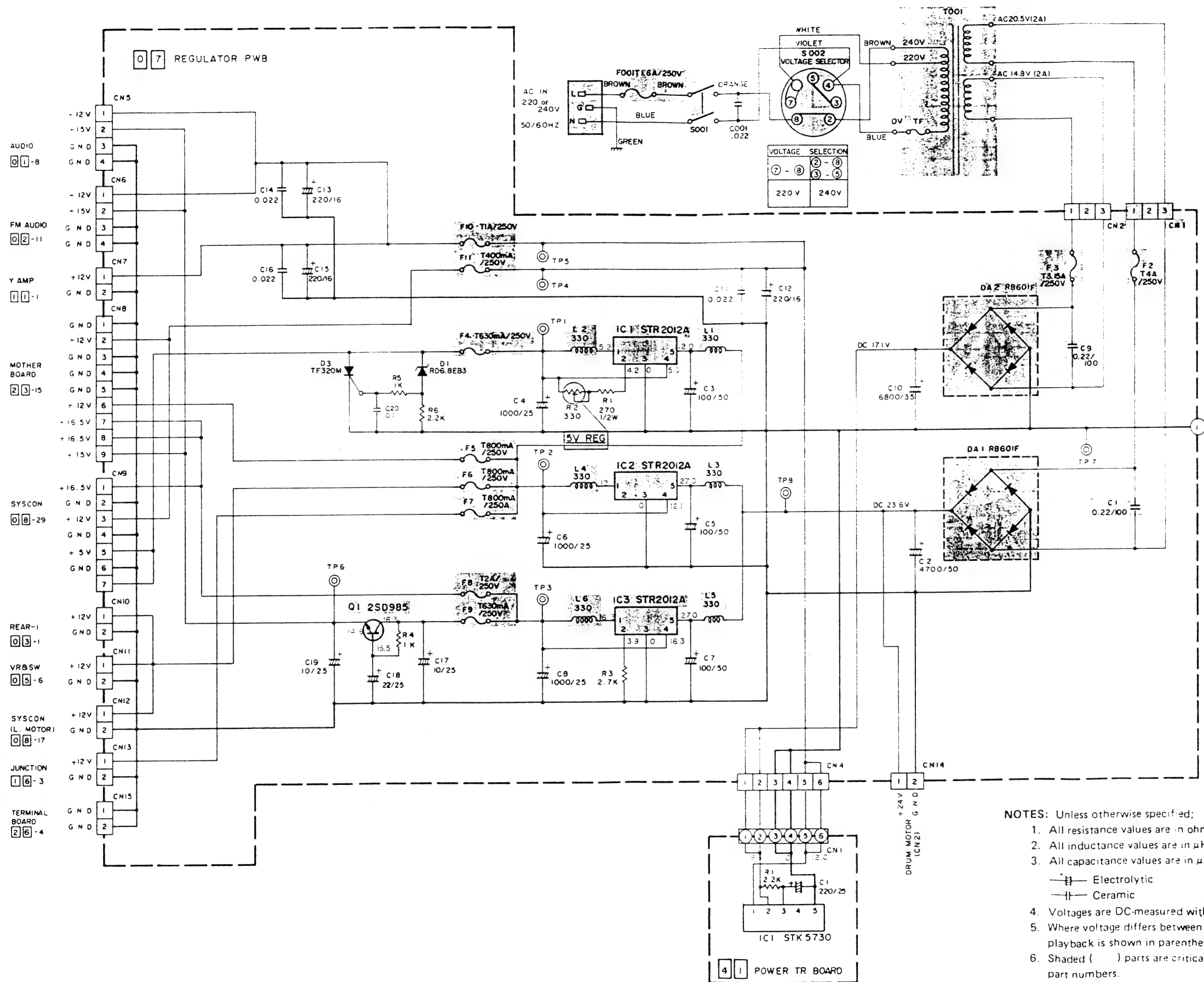
- NOTES: Unless otherwise specified;
1. All resistance values are in ohms. (1/6W).
 2. All inductance values are in μ H.
 3. All capacitance values are in μ F.
 4. Voltages are DC-measured with a digital voltmeter during recording mode.
 5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.

6. Shaded () parts are critical for safety. Replace only with specified part numbers.
7. NPN type digital transistors are DTC124F.
8. PNP type digital transistors are DTA124F.
9. All diodes are 1SS133.

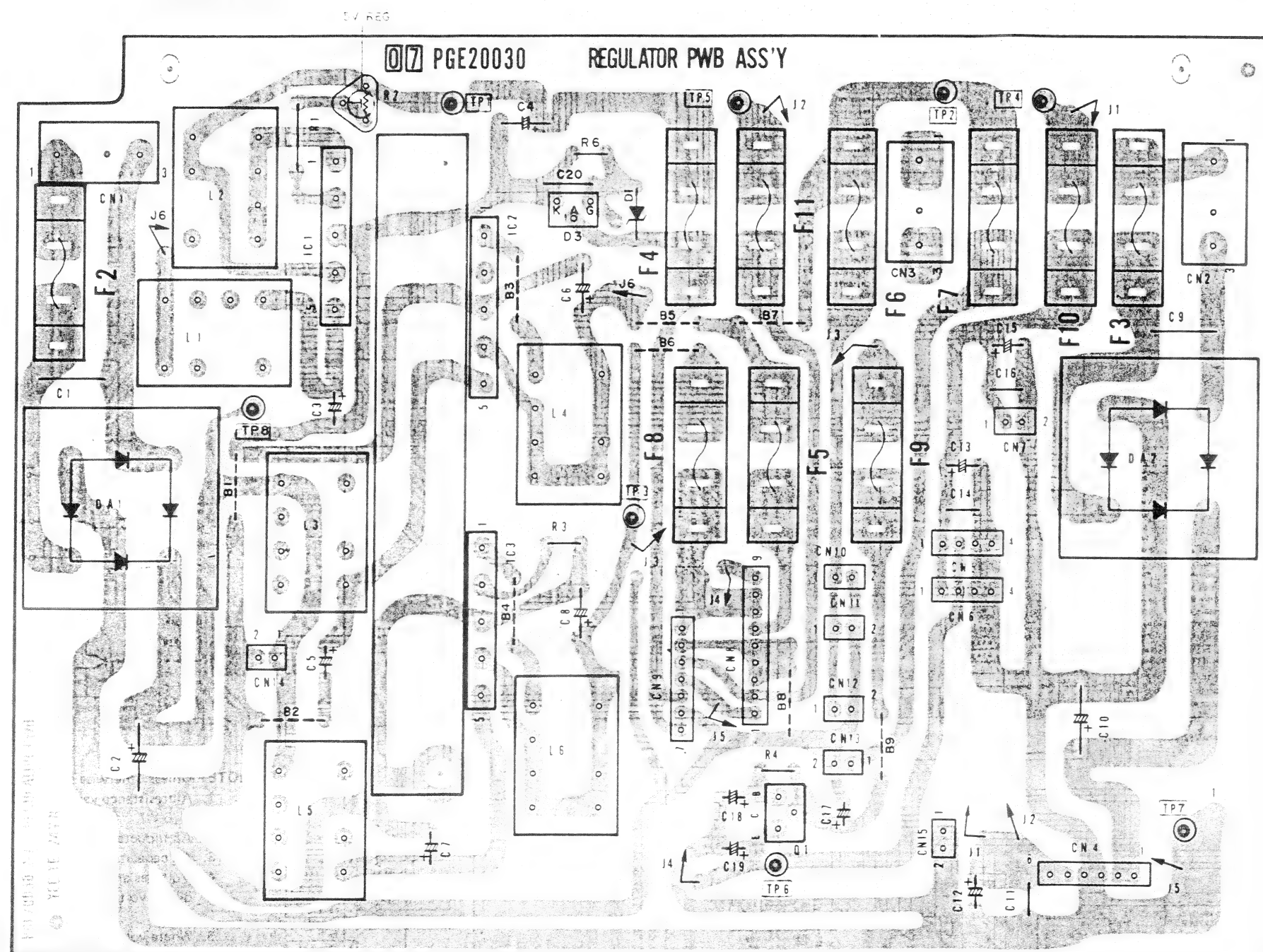




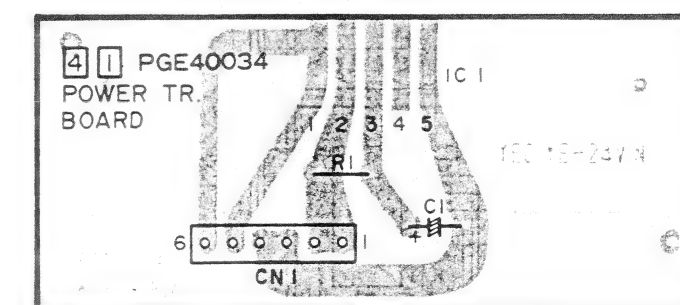
4.15 REGULATOR & POWER TRANSISTOR SCHEMATIC DIAGRAMS

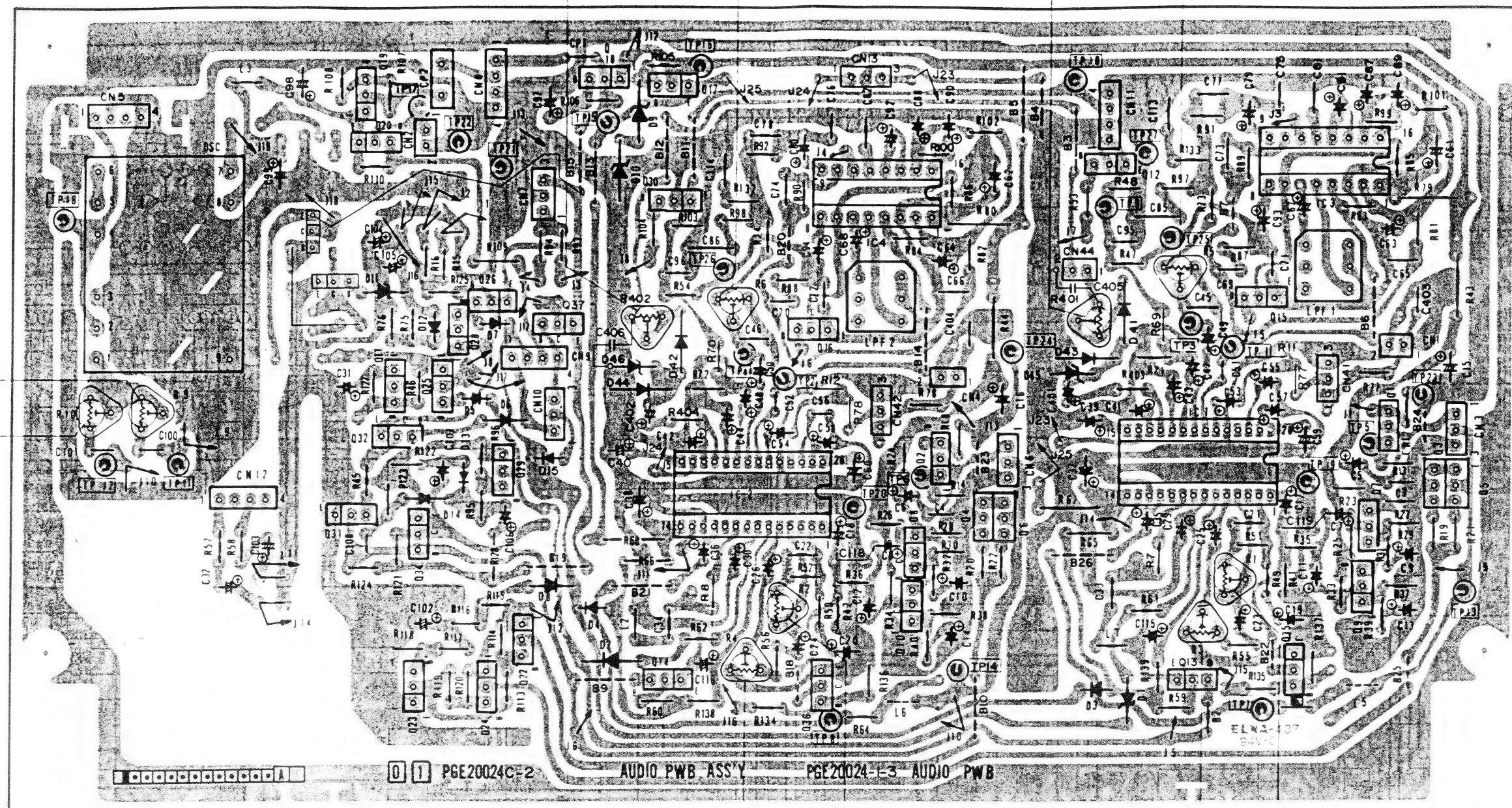


— REGULATOR —



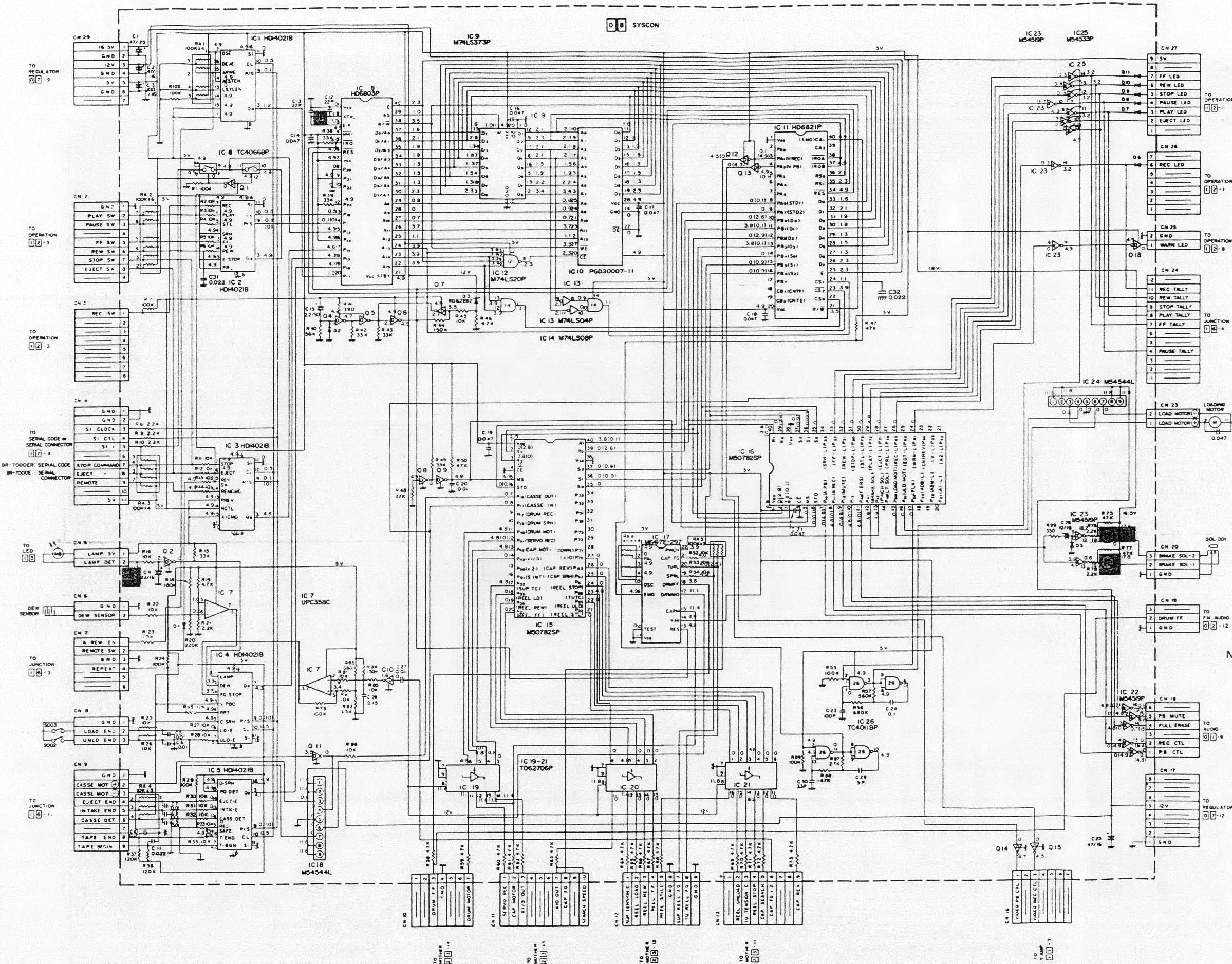
— POWER TRANSISTOR —



— MAIN WAVEFORMS OF
AUDIO CIRCUIT —

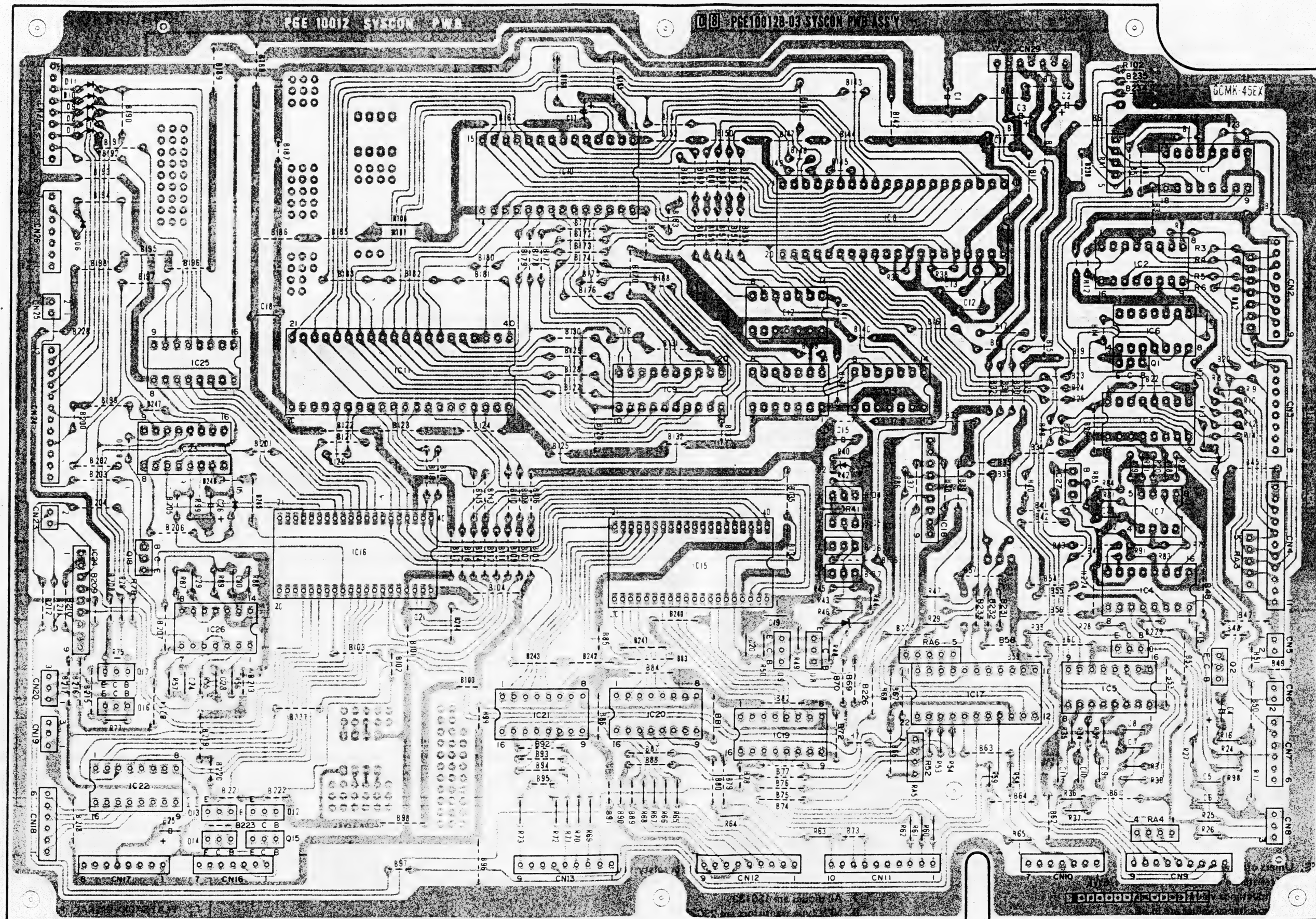
<p>W1</p> <p>TP-13 29 Vp-p 70 kHz (REC)</p>	<p>W2</p> <p>TP-14 28 Vp-p 70 kHz (REC)</p>	<p>W3</p> <p>TP-1 0.06 Vp-p 1 kHz (PB)</p>	<p>W4</p> <p>TP-2 0.06 Vp-p 1 kHz (PB)</p>	<p>W5</p> <p>TP-25 2 Vp-p 1 kHz (PB)</p>	<p>W6</p> <p>TP-26 2 Vp-p 1 kHz (PB)</p>	<p>W7</p> <p>TP-15 8.5 V DC</p>
<p>W8</p> <p>TP-16 10.6 V DC</p>	<p>W9</p> <p>TP-9 1 Vp-p 1 kHz (PB)</p>	<p>W10</p> <p>TP-10 1 Vp-p 1 kHz (PB)</p>	<p>W11</p> <p>TP-11 42 Vp-p 70 kHz (REC)</p>	<p>W12</p> <p>TP-12 42 Vp-p 70 kHz (REC)</p>	<p>W13</p> <p>TP-17 12.1 V DC (REC)</p>	<p>W14</p> <p>TP-18 85 Vp-p 70 kHz (REC)</p>

4.17 SYSTEM CONTROL SCHEMATIC DIAGRAM

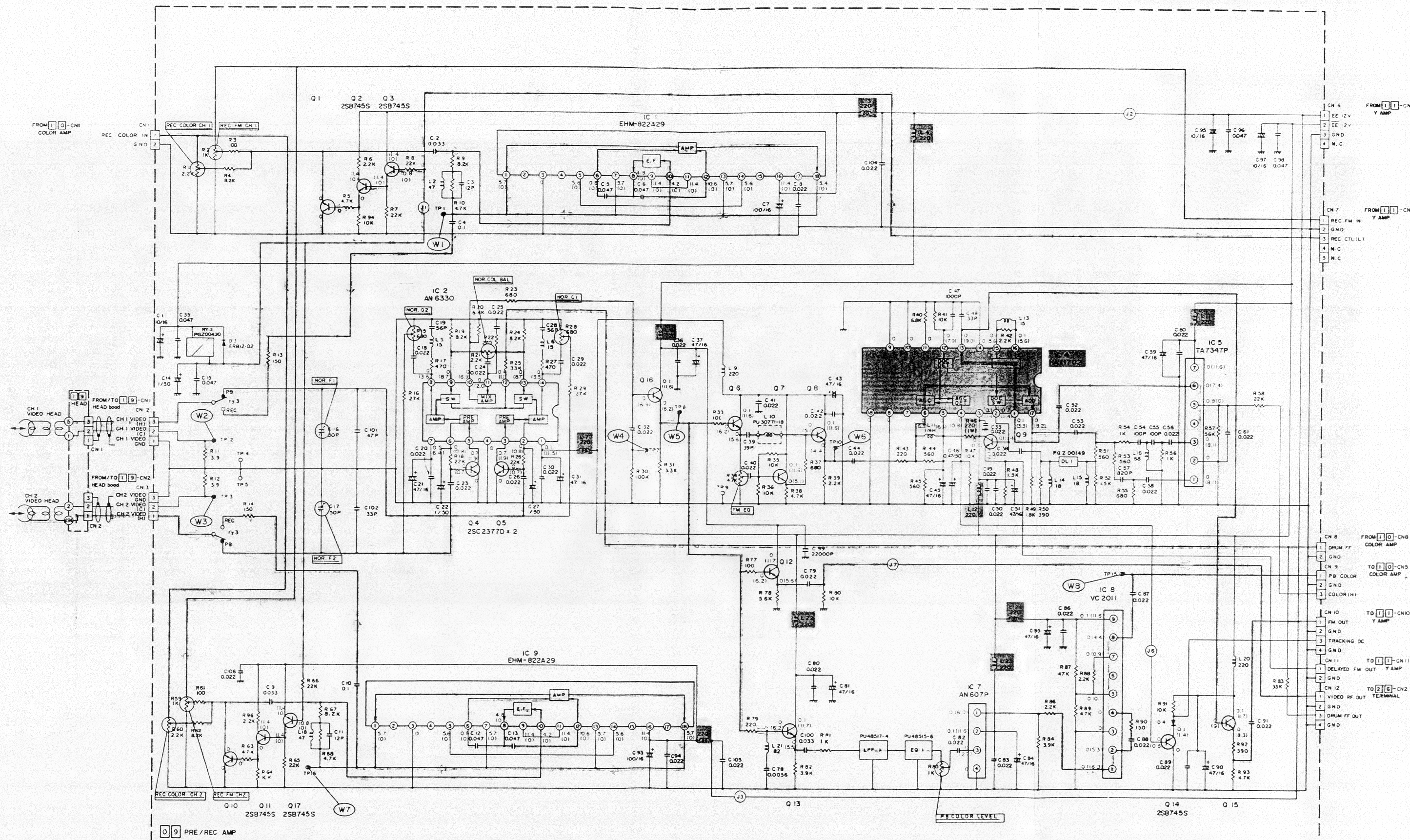


- NOTE: Unless otherwise specified;
1. All resistance values are in ohms. (1/6 W)
 2. All inductance values are in μ H.
 3. All capacitance values are in μ F.
 4. Voltages are DC-measured with a digital voltmeter during recording mode.
 5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
 6. Shaded parts are critical for safety. Replace only with specified part numbers.
 7. PNP type transistors are 2SB907.
 8. NPN type digital transistors are DTC124F.
 9. PNP type digital transistors are DTA124F.
 10. All diodes are 1SS133.

4.18 SYSTEM CONTROL CIRCUIT BOARD



4.19 PRE/REC SCHEMATIC DIAGRAM



NOTES: Unless otherwise specified;

1. All resistance values are in ohms. (1/6W).
2. All inductance values are in μ H.
3. All capacitance values are in μ F.
4. Voltages are DC-measured with a digital voltmeter during recording mode.
5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.

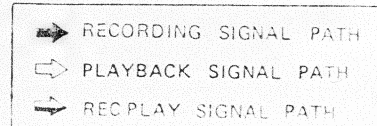
6. Shaded () parts are critical for safety. Replace only with specified part numbers.

7. All diodes are 1SS133.

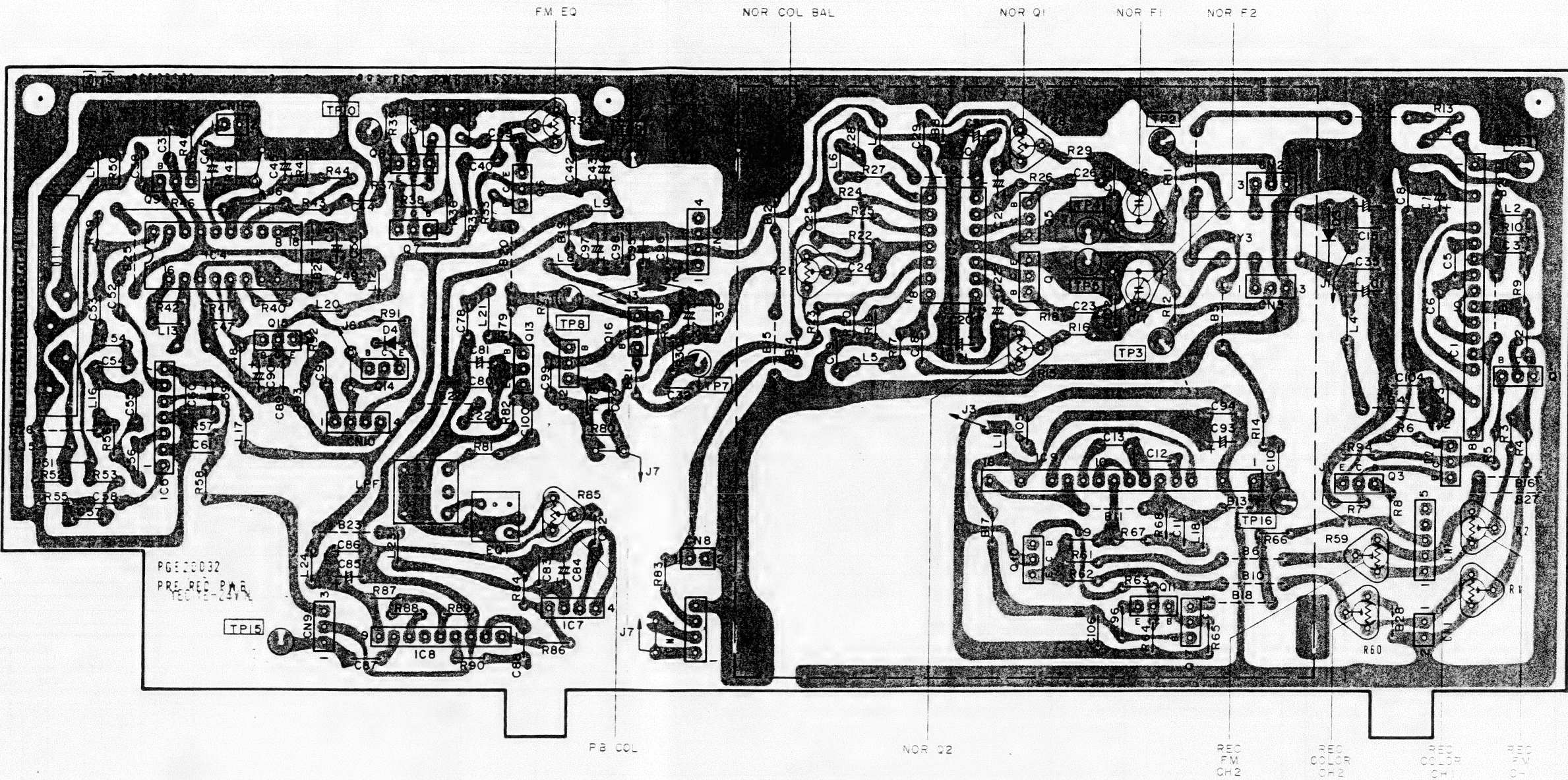
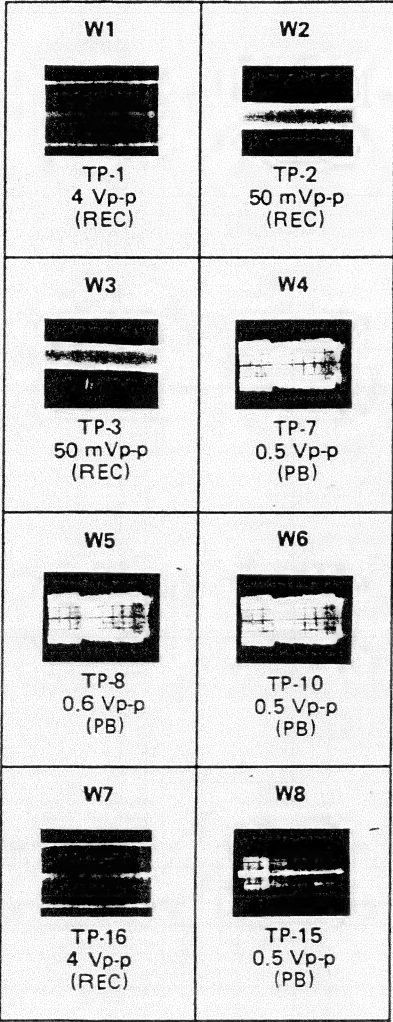
8. NPN type transistors are 2SC2647C.

— Electrolytic

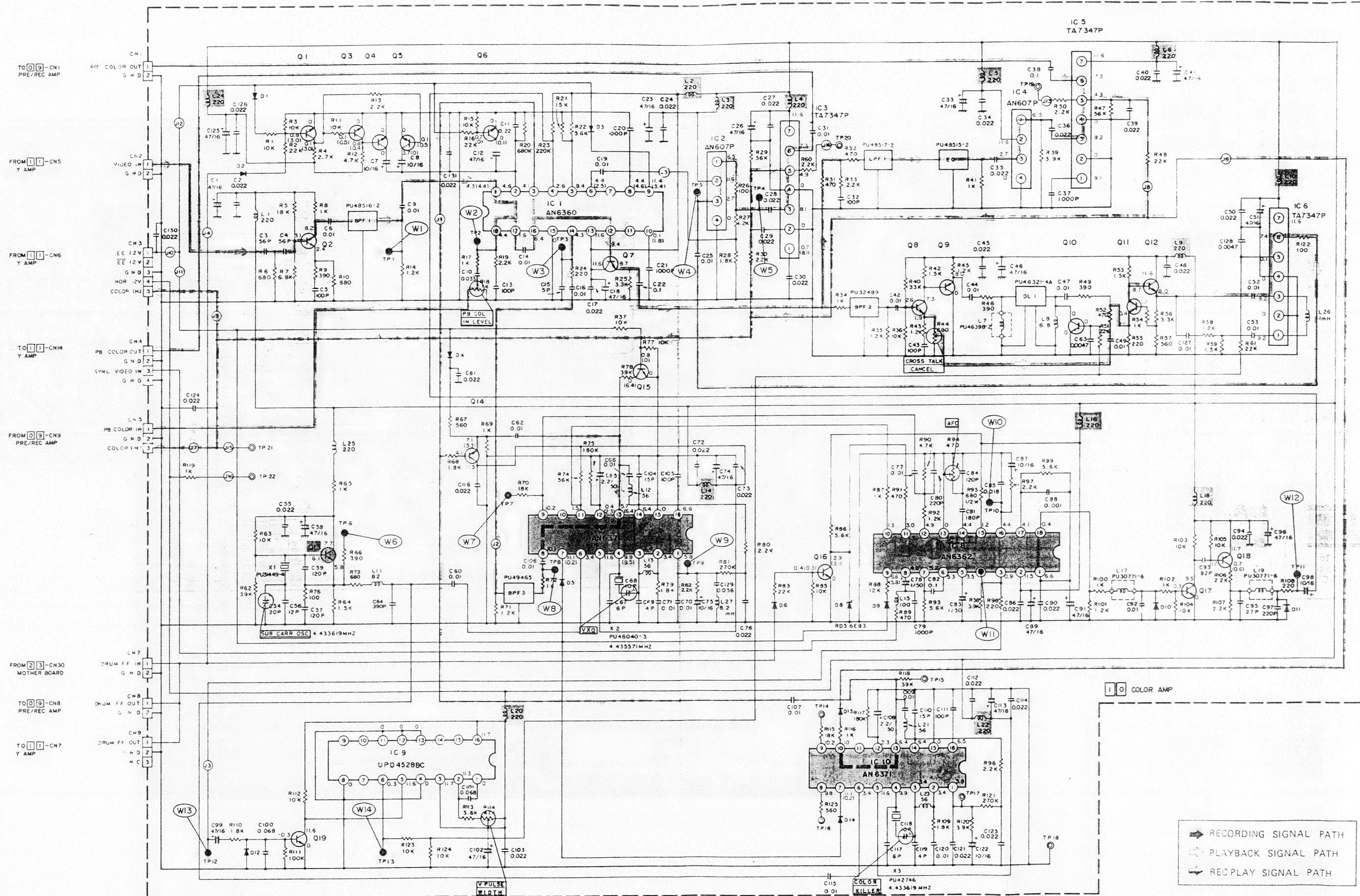
— Mylar or Ceremic



— MAIN WAVEFORMS OF PRE/REC
AMP CIRCUIT —



4.21 COLOR SCHEMATIC DIAGRAM



NOTES: Unless otherwise specified;

1. All resistance values are in ohms. (1/8 W).
2. All inductance values are in μ H.
3. All capacitance values are in μ F.

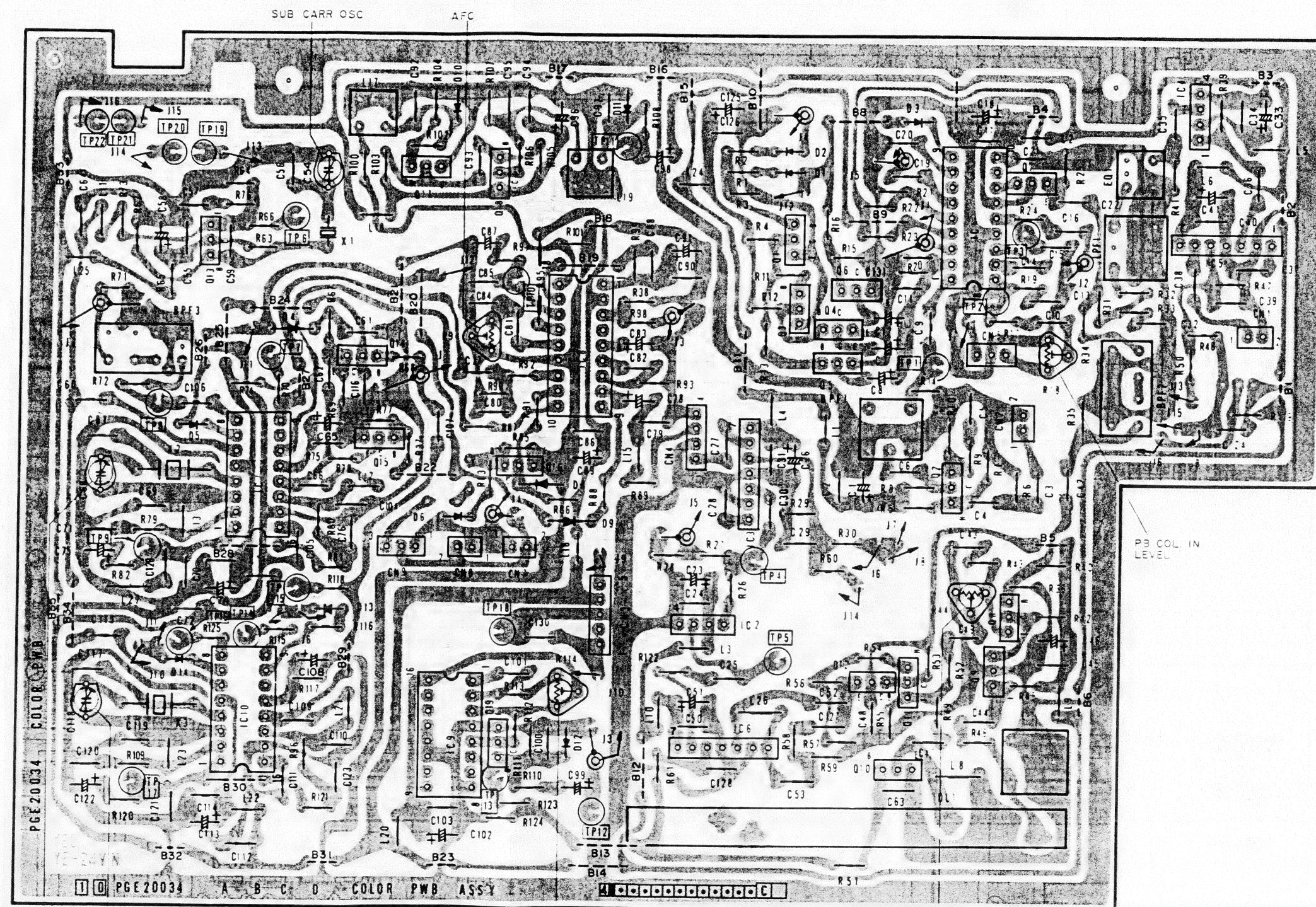
4. Voltages are DC-measured with a digital voltmeter during recording mode.
5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.

6. Shaded () parts are critical for safety. Replace only with specified part numbers.
7. NPN type transistors are 2SC2647C.
8. PNP type transistors are 2SB641Q.

4.22 COLOR CIRCUIT BOARD

— MAIN WAVEFORMS OF VIDEO (COLOR) CIRCUIT —

<p>W1</p> <p>TP-1 3.2 Vp-p (REC)</p>	<p>W2</p> <p>TP-2 0.25 Vp-p (PB)</p>
<p>W3</p> <p>TP-3 0.36 Vp-p 5.06 MHz</p>	<p>W4</p> <p>TP-5 70 mVp-p (PB)</p>
<p>W5</p> <p>TP-4 0.6 Vp-p (PB)</p>	<p>W6</p> <p>TP-6 4.43619 MHz</p>
<p>W7</p> <p>TP-7 1 Vp-p 625 kHz</p>	<p>W8</p> <p>TP-8 1.6 Vp-p, (REC) 1.8 Vp-p, (PB) 5.06 MHz</p>
<p>W9</p> <p>TP-9 5.8 VDC (REC)</p>	<p>W10</p> <p>TP-10 4.4 VDC</p>
<p>W11</p> <p>IC8, Pin 4 6 Vp-p 16.625 kHz</p>	<p>W12</p> <p>TP-11 4.6 Vp-p, (REC) 5.2 Vp-p, (PB)</p>
<p>W13</p> <p>TP-12 8 Vp-p, 50 Hz (PB)</p>	<p>W14</p> <p>TP-13 150 mVp-p (PB)</p>



VCC COLOR KILLER

V PULSE WIDTH

CROSS TALK CANCEL

A

B

C

10 COLOR 4-23

4-23 10 COLOR

F

G

H

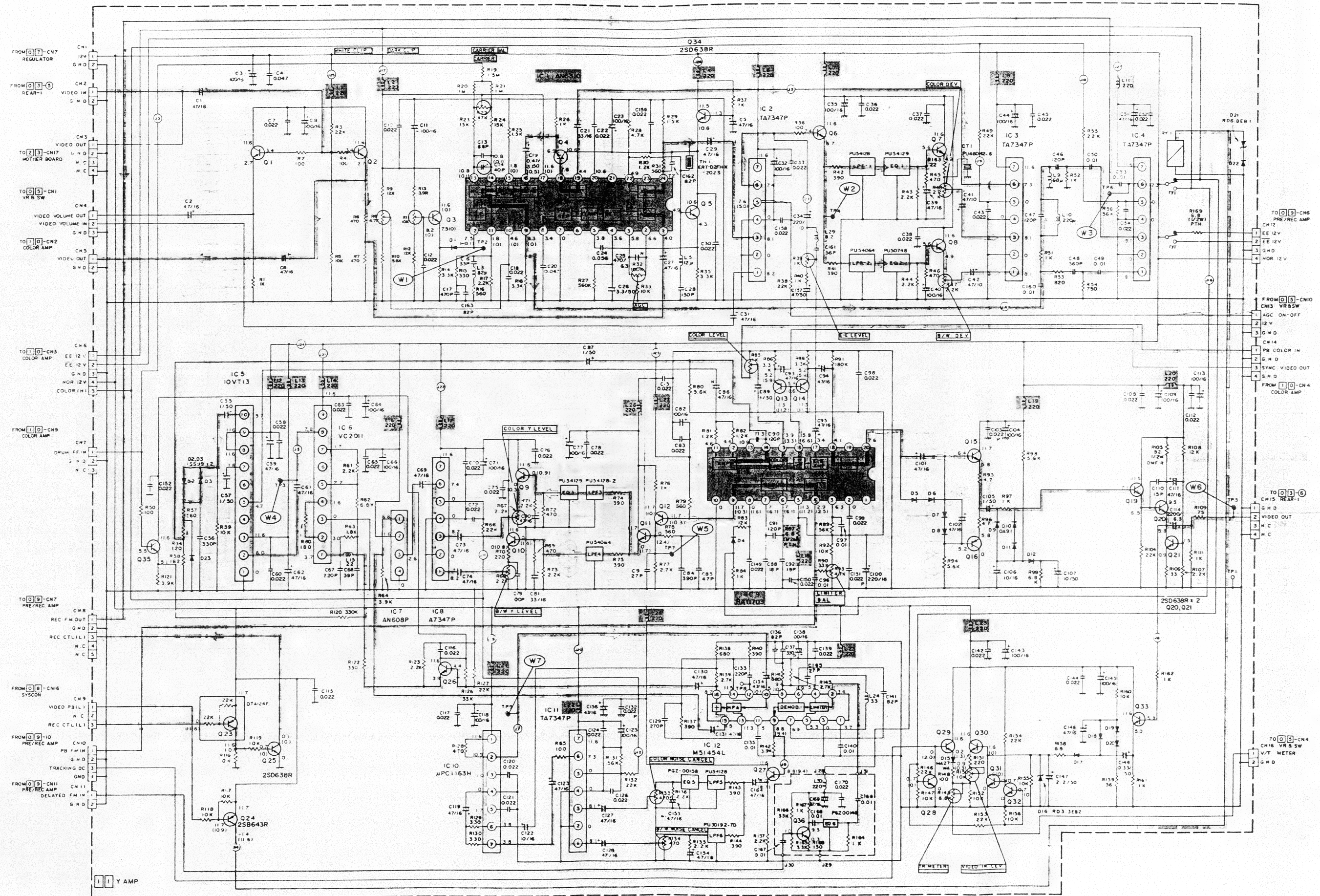
4.23 Y AMP SCHEMATIC DIAGRAM

NOTES: Unless otherwise specified;

1. All resistance values are in ohms. (1/8 W).
2. All inductance values are in μ H.
3. All capacitance values are in μ F.

4. Voltages are DC-measured with a digital voltmeter during recording mode.
5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
6. Shaded () parts are critical for safety. Replace only with specified part numbers.

7. NPN type transistors are 2SC2647C.
8. PNP type transistors are 2SB641Q.



A

B

C

Y AMP 4-24

4-24

Y AMP

F

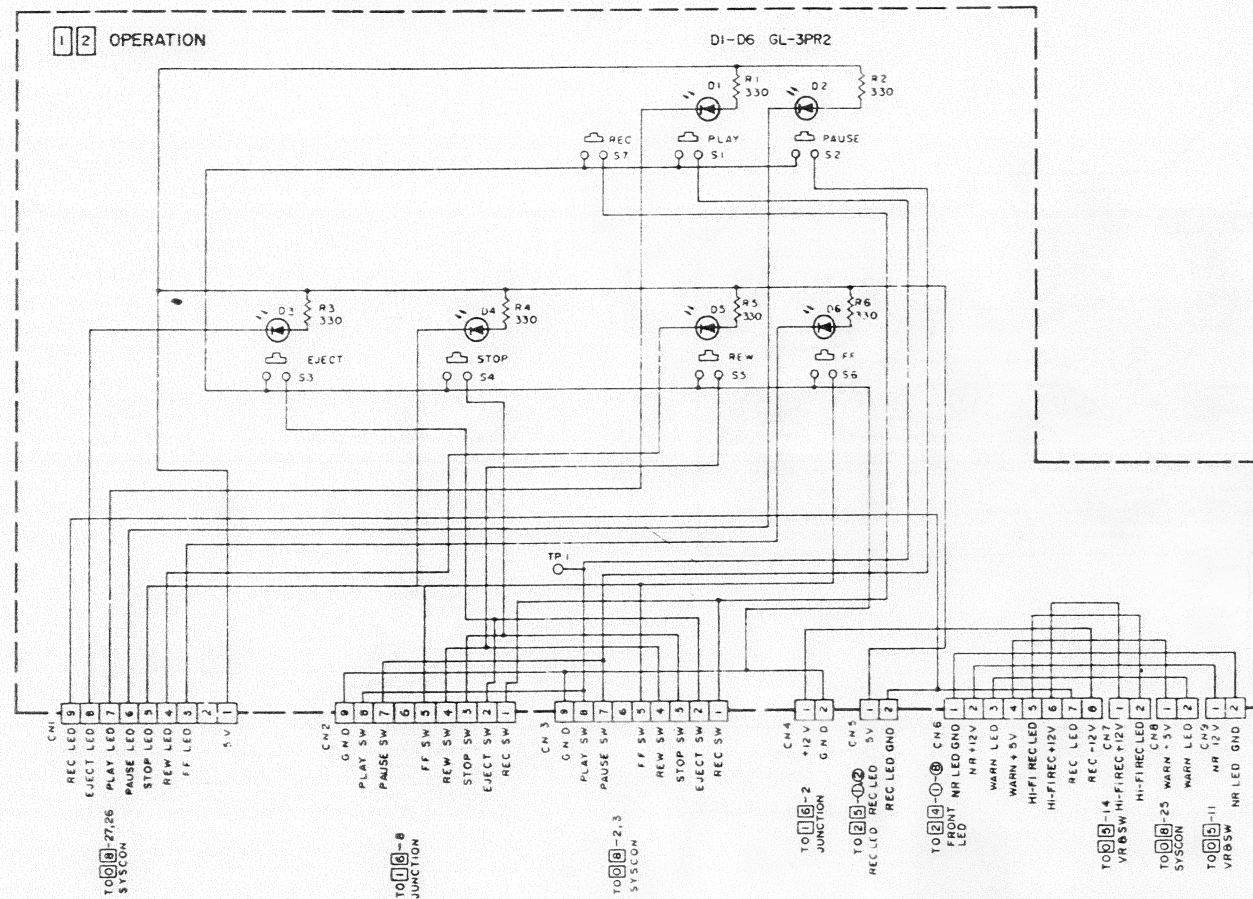
G

H

5

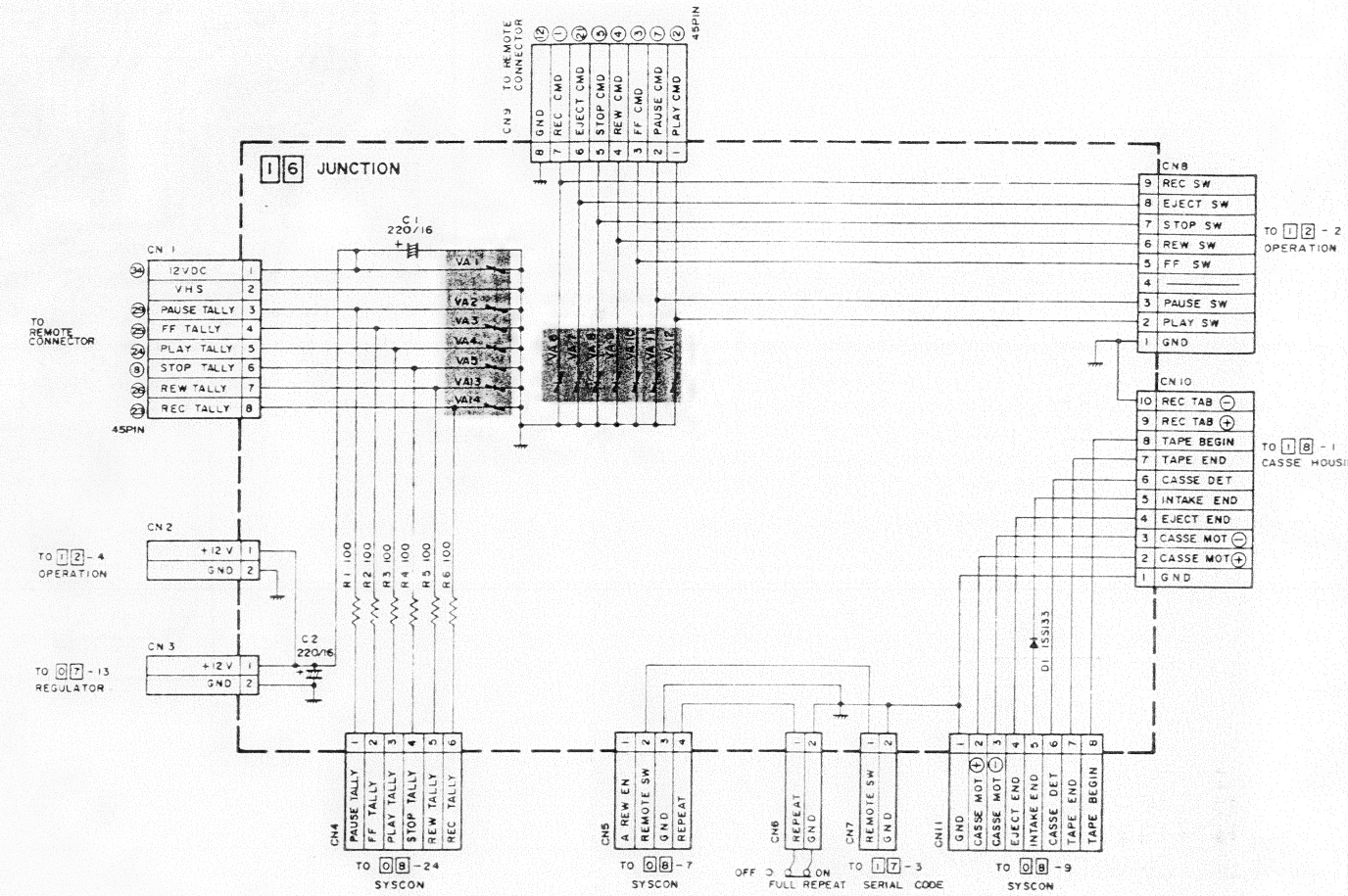


4.25 OPERATION SCHEMATIC DIAGRAM

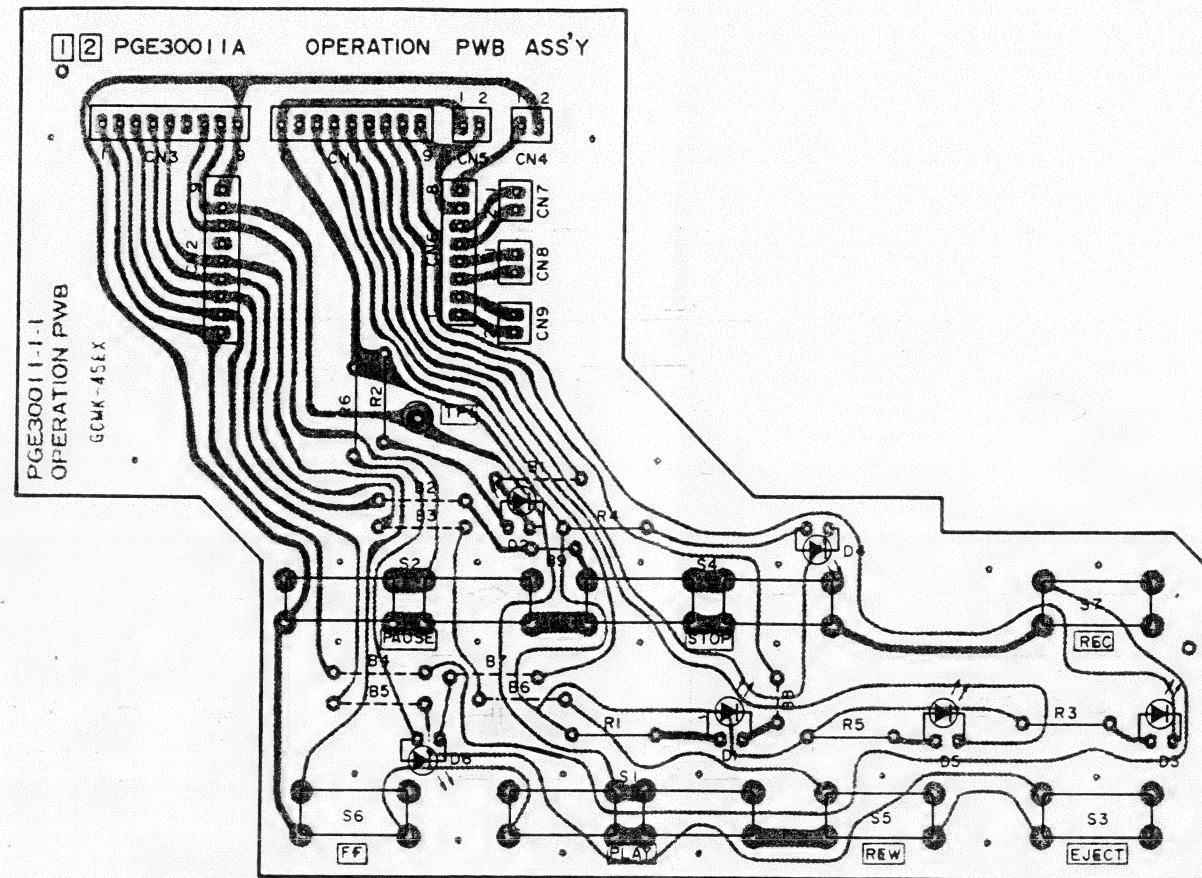


- NOTES: Unless otherwise specified.
1. All resistance values are in ohms. (1/8 W).
 2. All inductance values are in μH .
 3. All capacitance values are in μF .

4.26 JUNCTION SCHEMATIC DIAGRAM



- NOTES: Unless otherwise specified.
1. All resistance values are in ohms. (1/6 W).
 2. All inductance values are in μH .
 3. All capacitance values are in μF .
 4. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
 5. All varistors are PU49624-2.



5

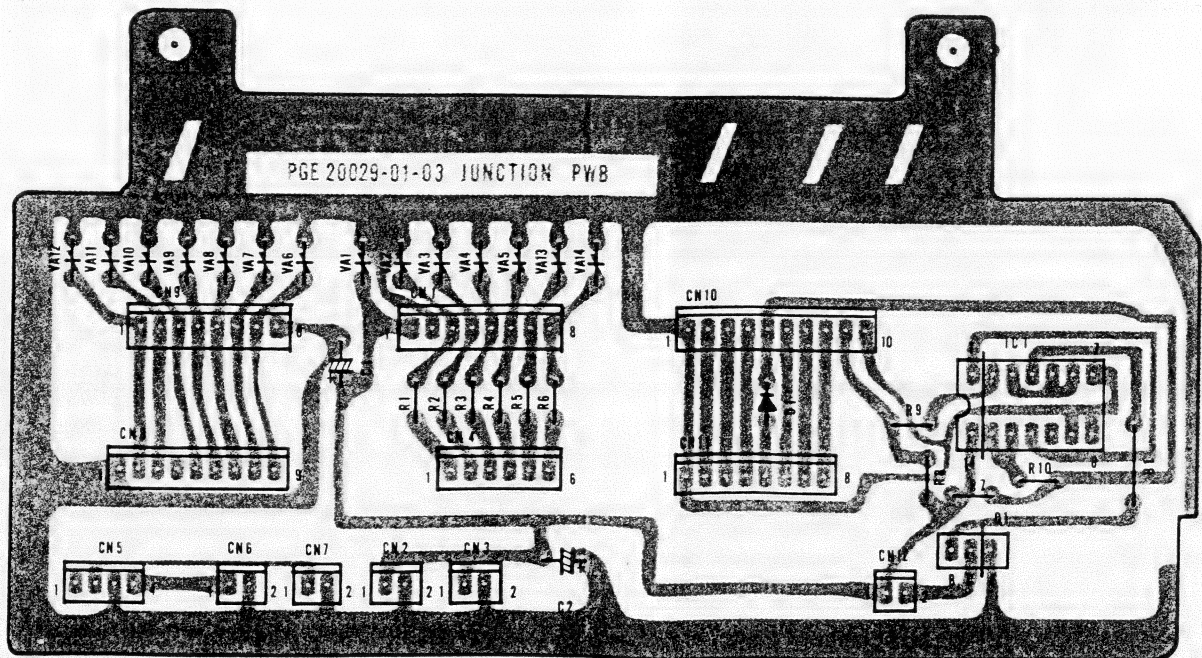
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3

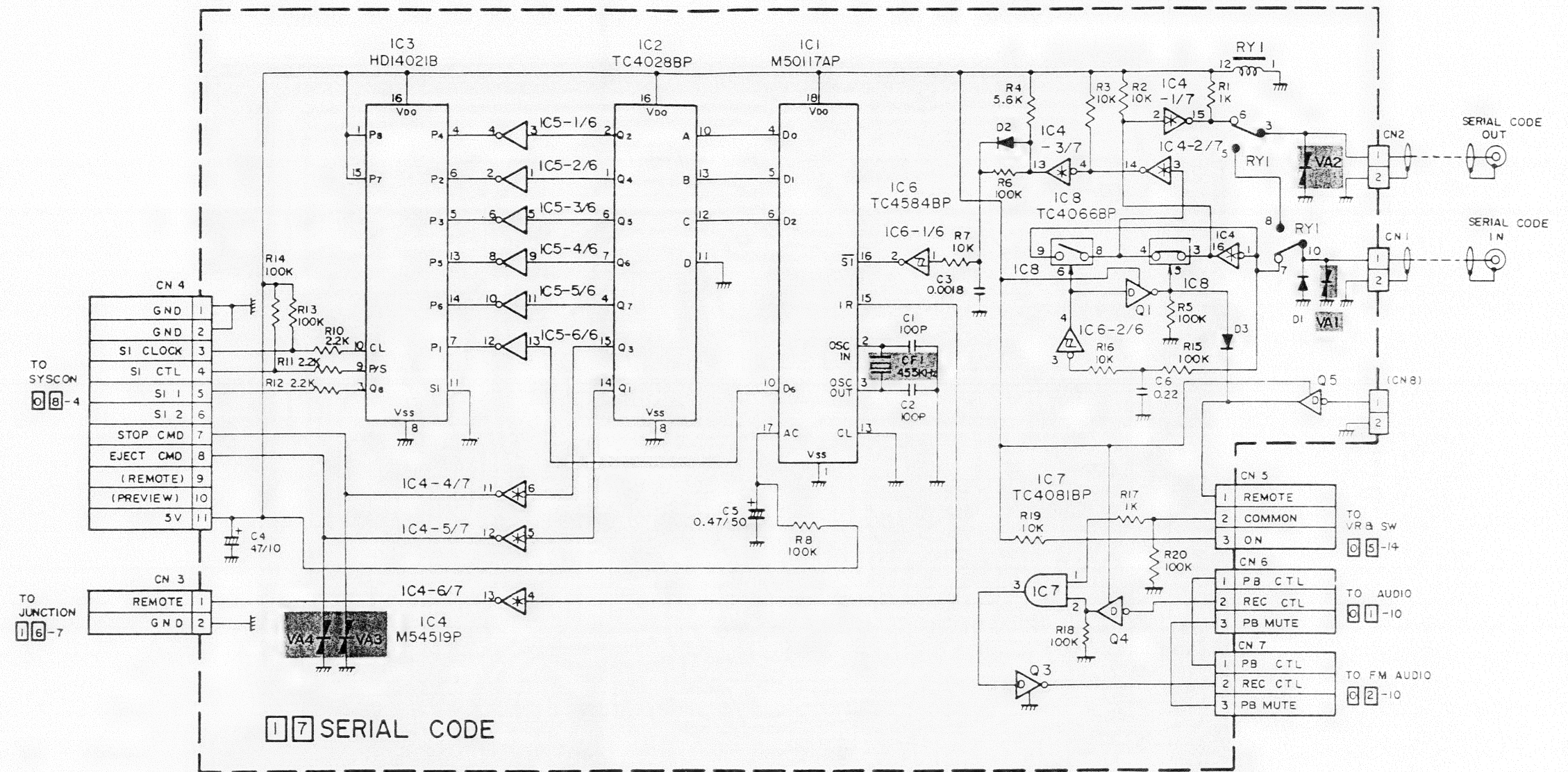
2

1

4.28 JUNCTION CIRCUIT BOARD



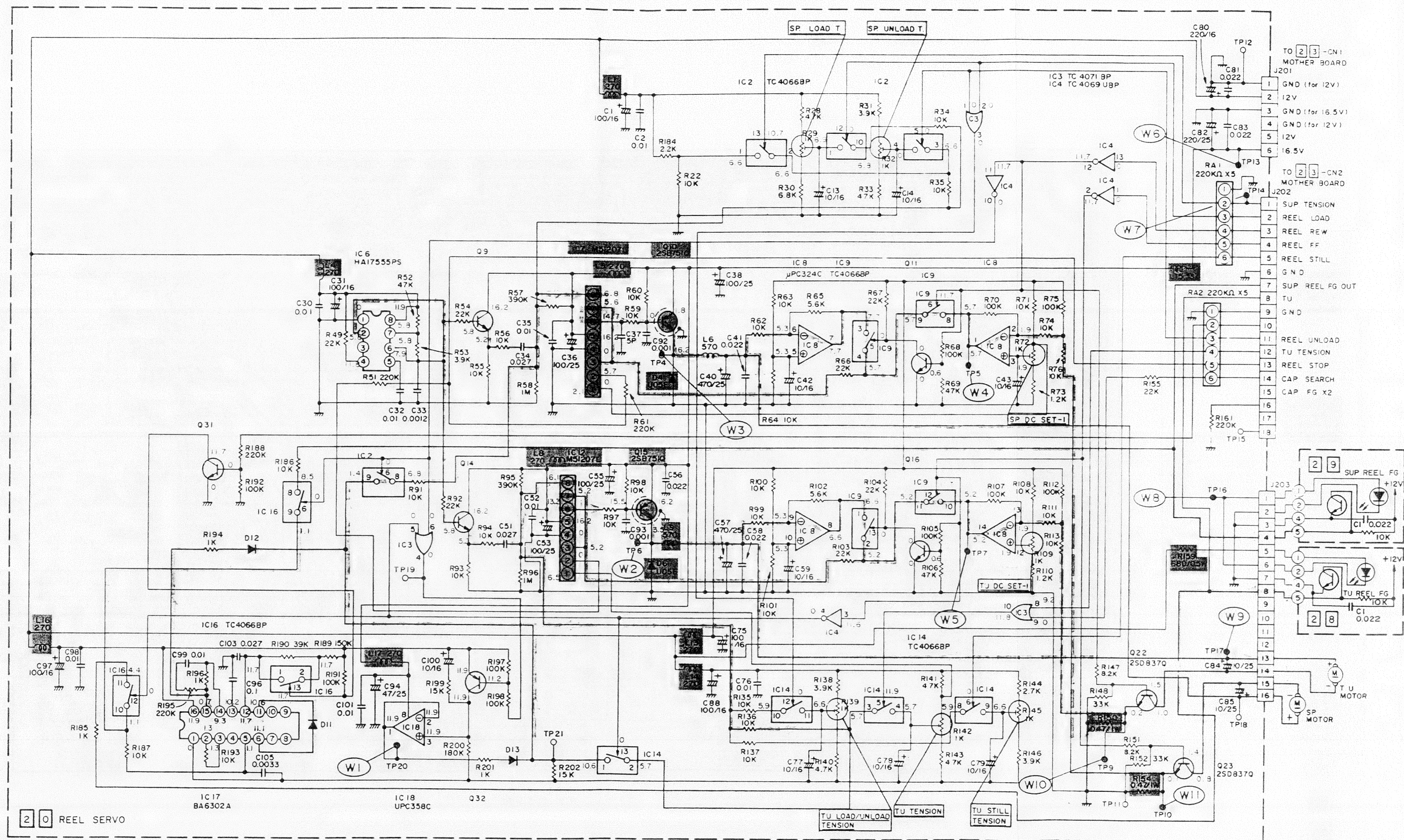
4.29 SERIAL CODE SCHEMATIC DIAGRAM



- NOTES: Unless otherwise specified.
1. All resistance values are in ohms. (1/6 W).
 2. All inductance values are in μ H.
 3. All capacitance values are in μ F.
 4. All varistors are PU49624-2.



4.31 REEL SERVO SCHEMATIC DIAGRAM



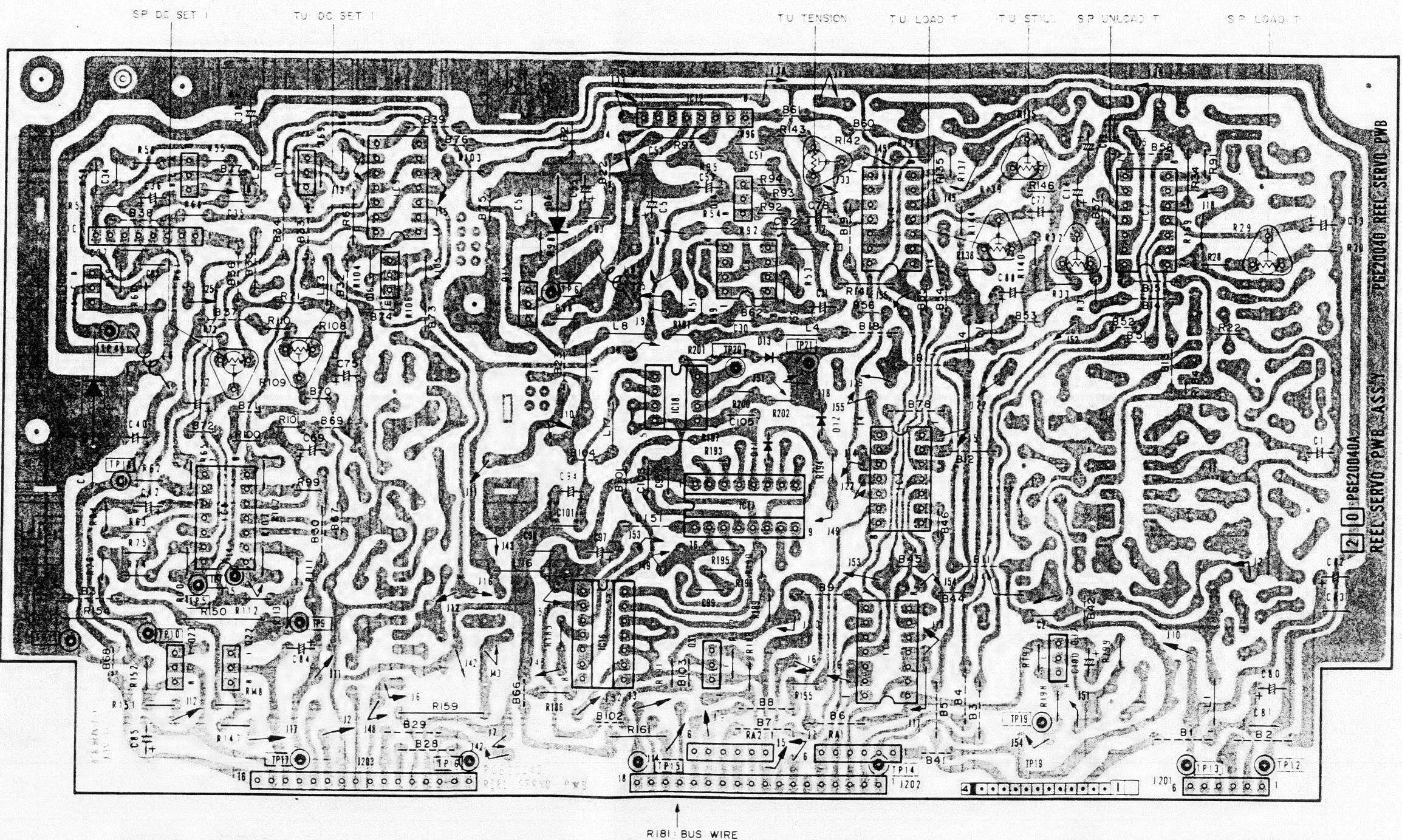
NOTES: Unless otherwise specified;

1. All resistance values are in ohms. (1/6W).
2. All inductance values are in μH .
3. Voltages are DC-measured with a digital voltmeter during recording mode.
4. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
5. Shaded () parts are critical for safety. Replace only with specified part numbers.

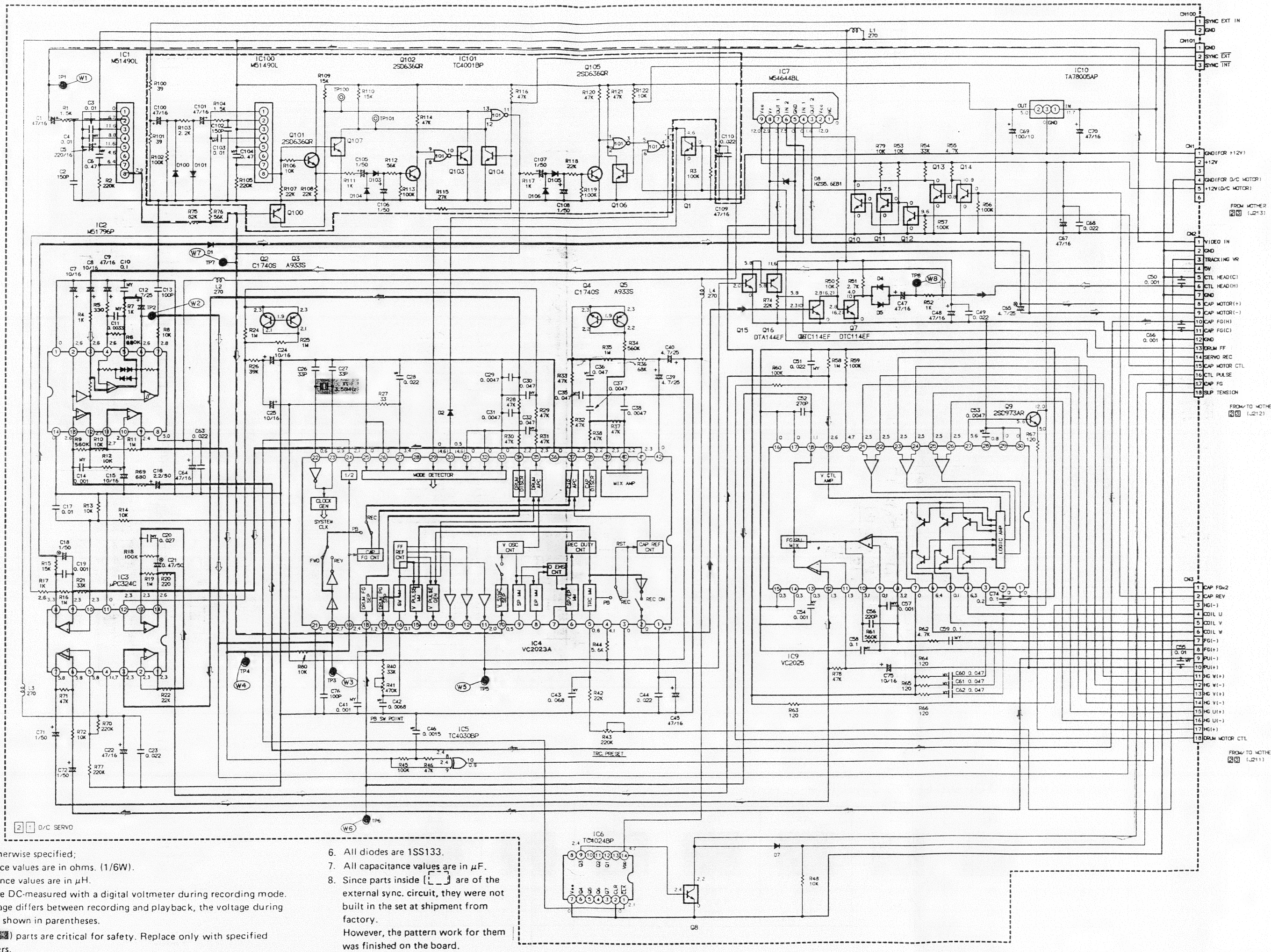
6. NPN type transistors are 2SD636RS.
7. PNP type transistors are 2SB641RS.
8. All diodes are 1SS133.
9. All capacitance values are in μF .

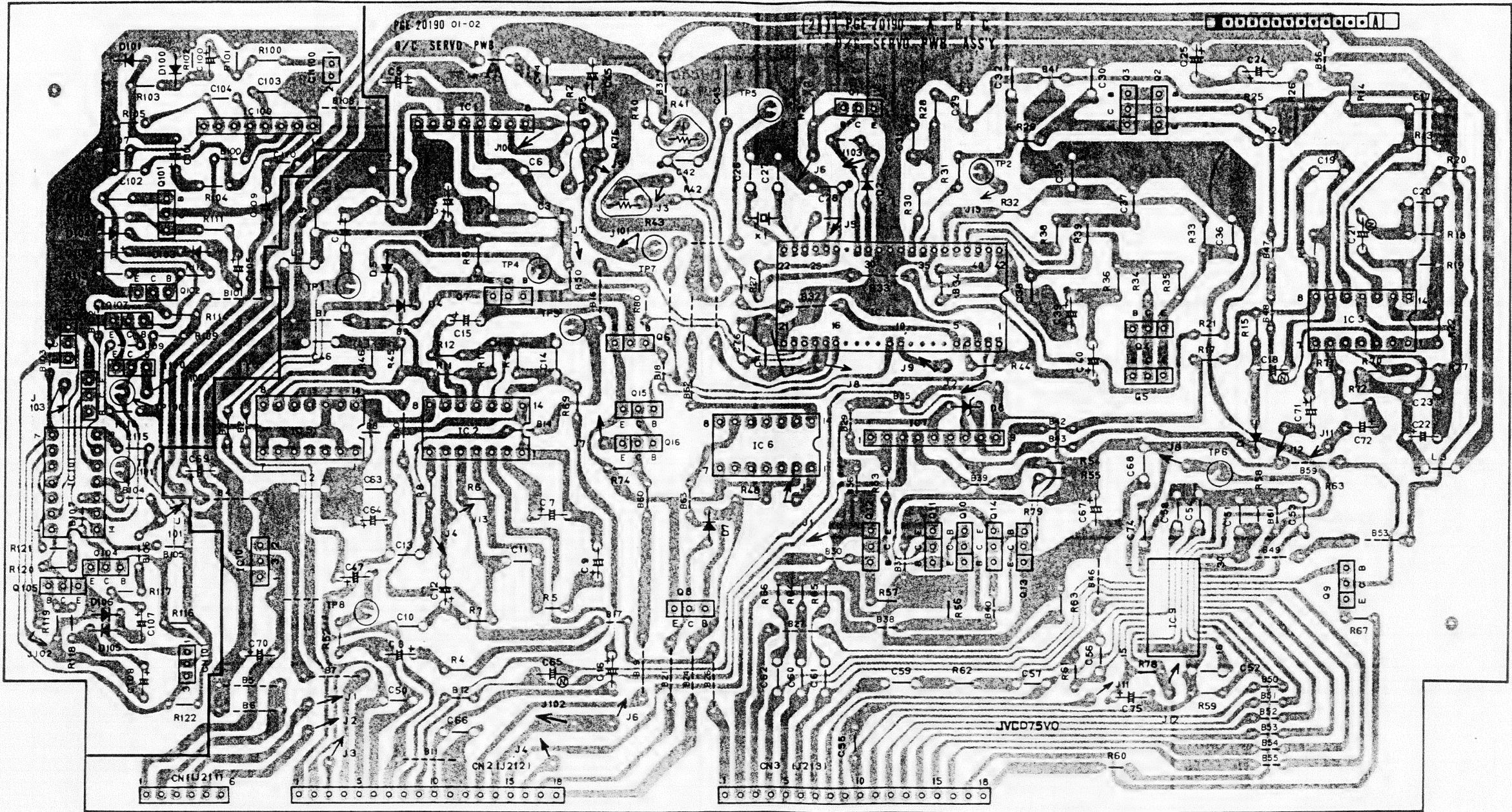
— MAIN WAVEFORM OF
REEL SERVO CIRCUIT —

W1	W2
TP-20 11.9 V DC	TP-6 17 Vp-p App. 20 kHz
W3	W4
TP-4 17 Vp-p App. 20 kHz	TP-5 6.0 V DC
W5	W6
TP-7 6.0 V DC	TP-13 17 V DC
W7	W8
TP-14 10.7 V DC	TP-16 1.2 V DC
W9	W10
TP-17 3.3 V DC (REC/PLAY) 2.2 V DC (STILL)	TP-9 0.2 V DC (REC/PLAY) 0.1 V DC (STILL)
W11	
TP-10 70 mV DC (REC/PLAY) 0.17 V DC (STILL)	

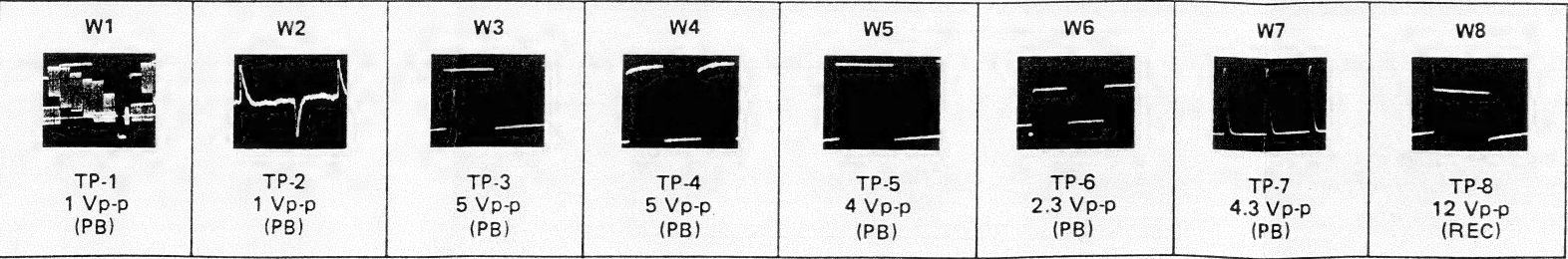


4.33 D/C SERVO SCHEMATIC DIAGRAM

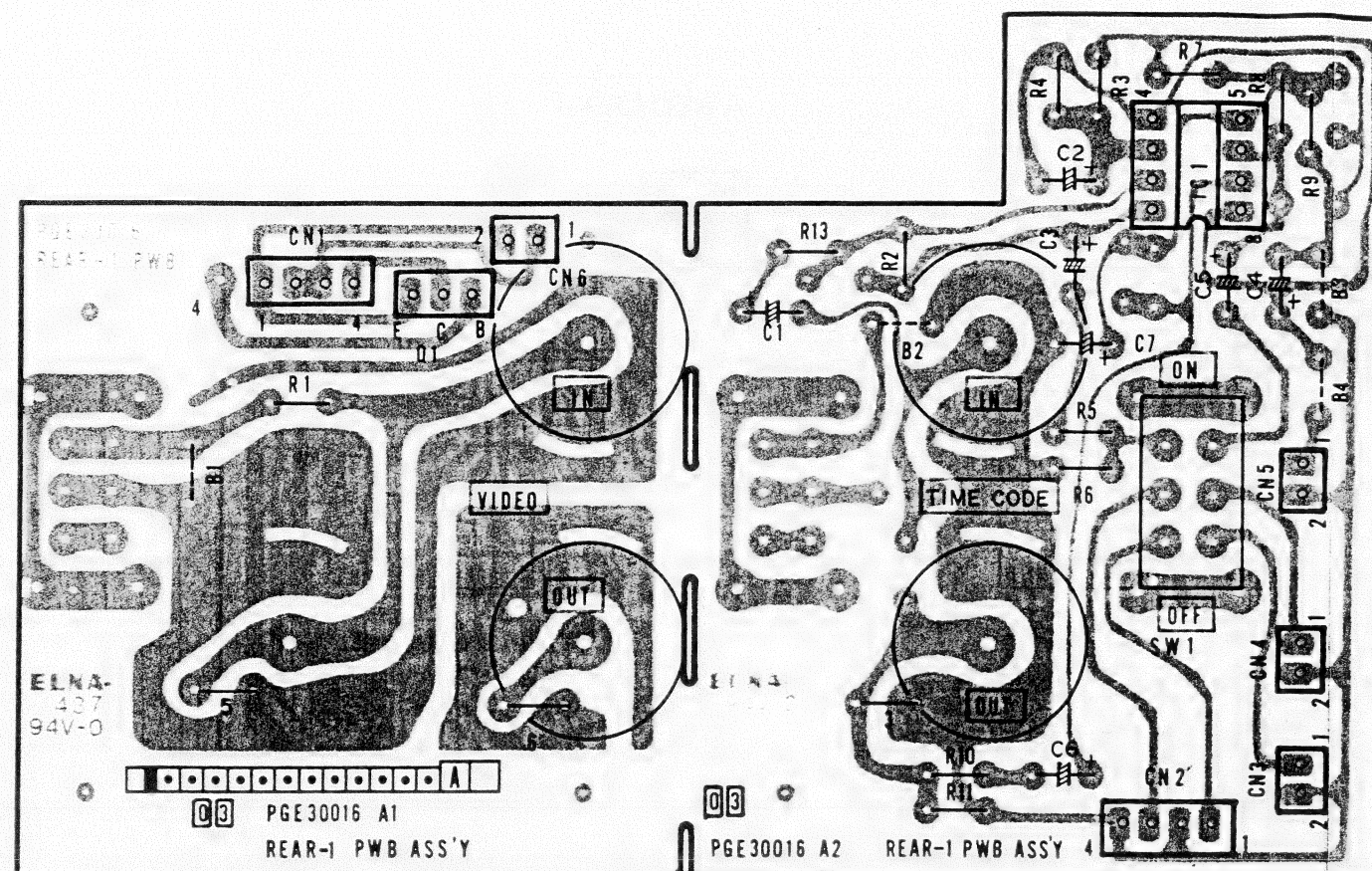




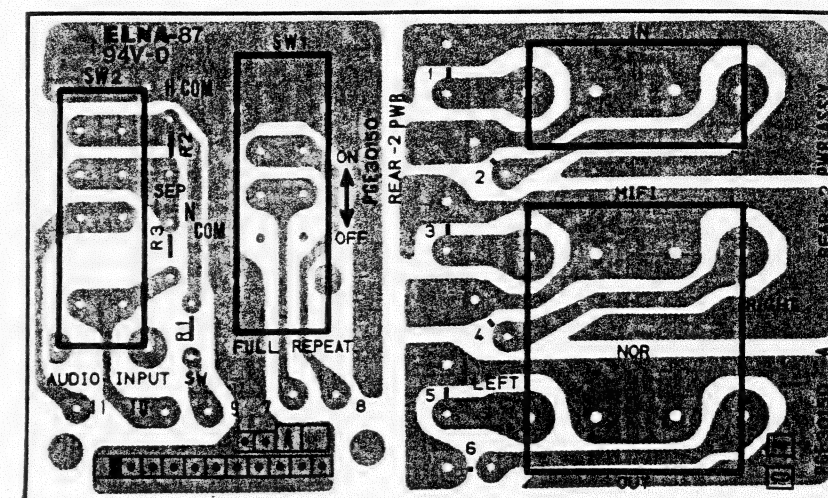
— MAIN WAVEFORM OF D/C SERVO CIRCUIT —



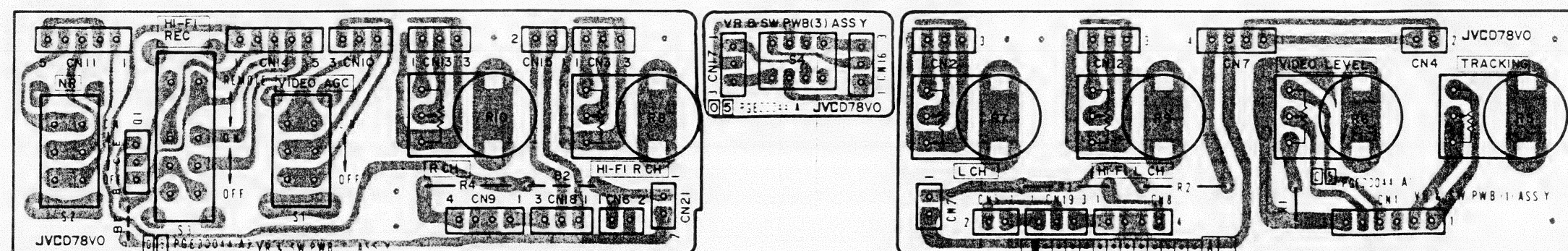
— REAR-1 —



— REAR-2 —

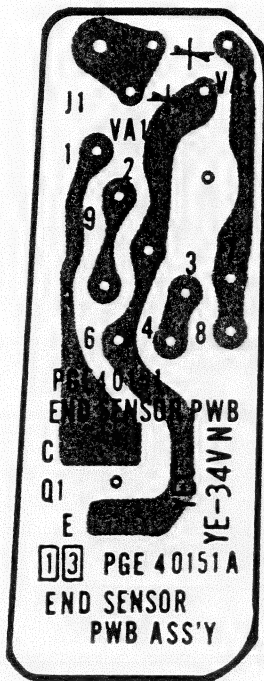


— VR & SW —

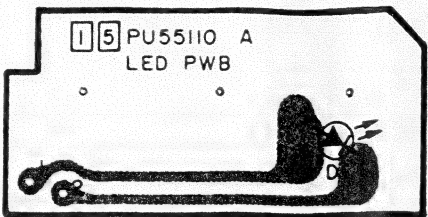


4.36 END SENSOR, CASSETTE HOUSING, LED, FRONT LED & TERMINAL
CIRCUIT BOARDS

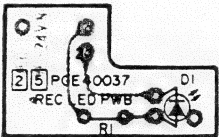
— END SENSOR —



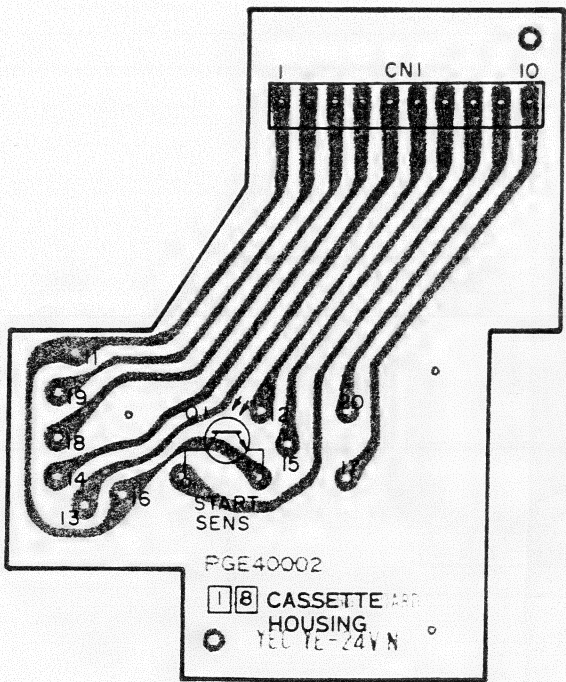
— LED —



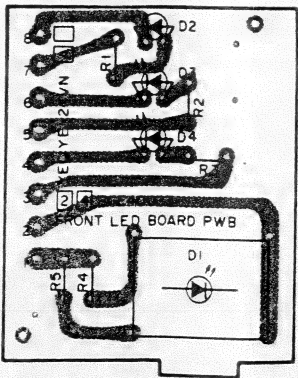
— REC LED —



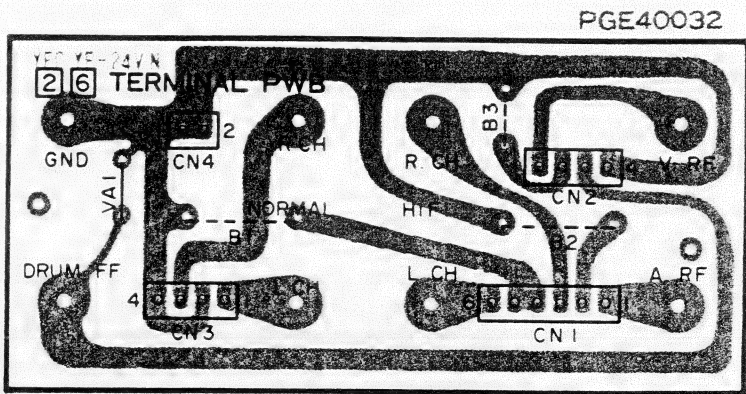
— CASSETTE HOUSING —



— FRONT LED —

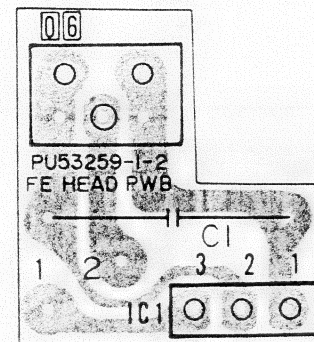


— TERMINAL —

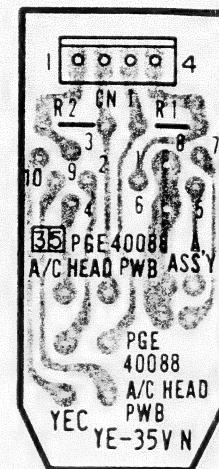


4.37 FE HEAD, LD/UNLD SW, A/C HEAD, AUDIO LIMITER SW, UPPER DRUM & CONNECT
CIRCUIT BOARDS

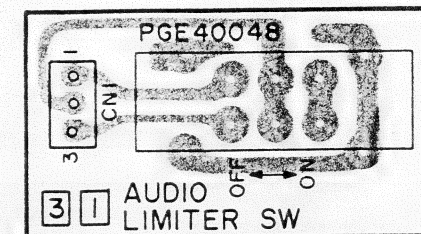
— FE HEAD —



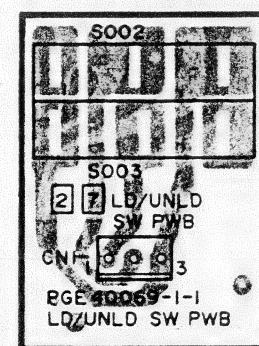
— A/C HEAD —



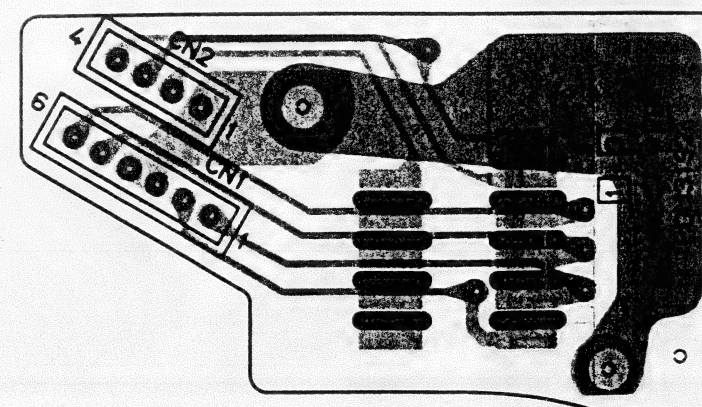
— AUDIO LIMITER SW —



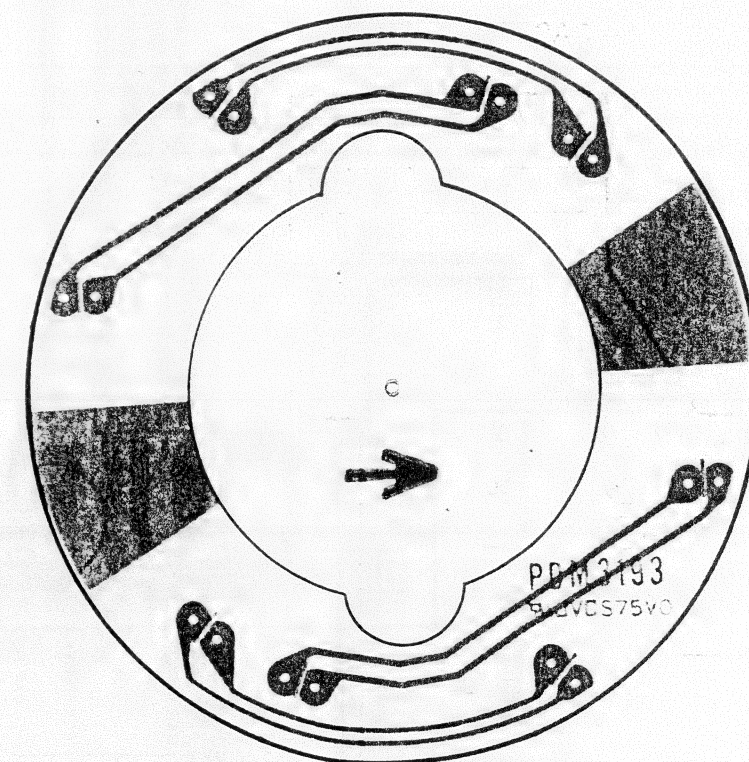
— LD/UNLD SW —



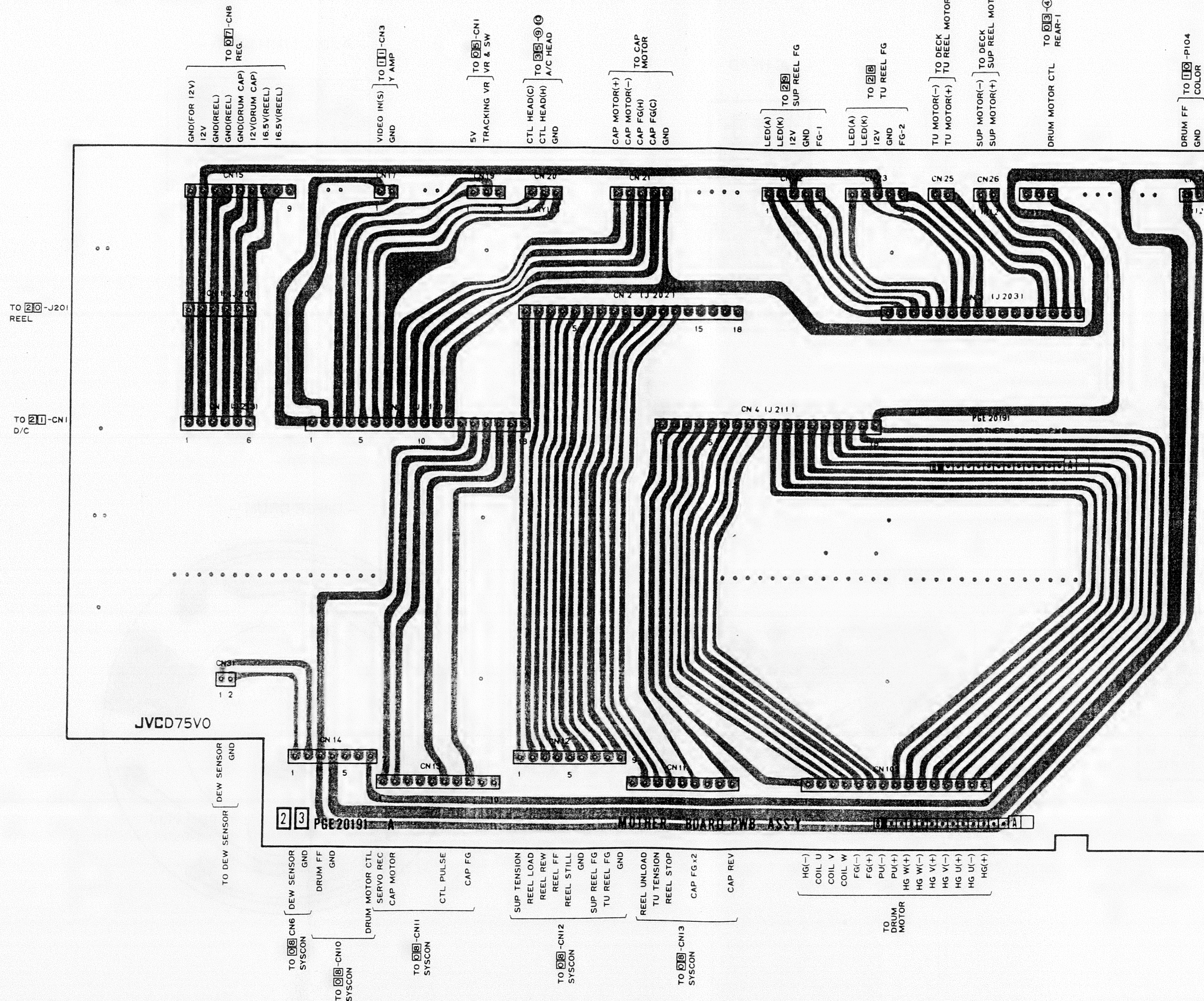
— CONNECT —

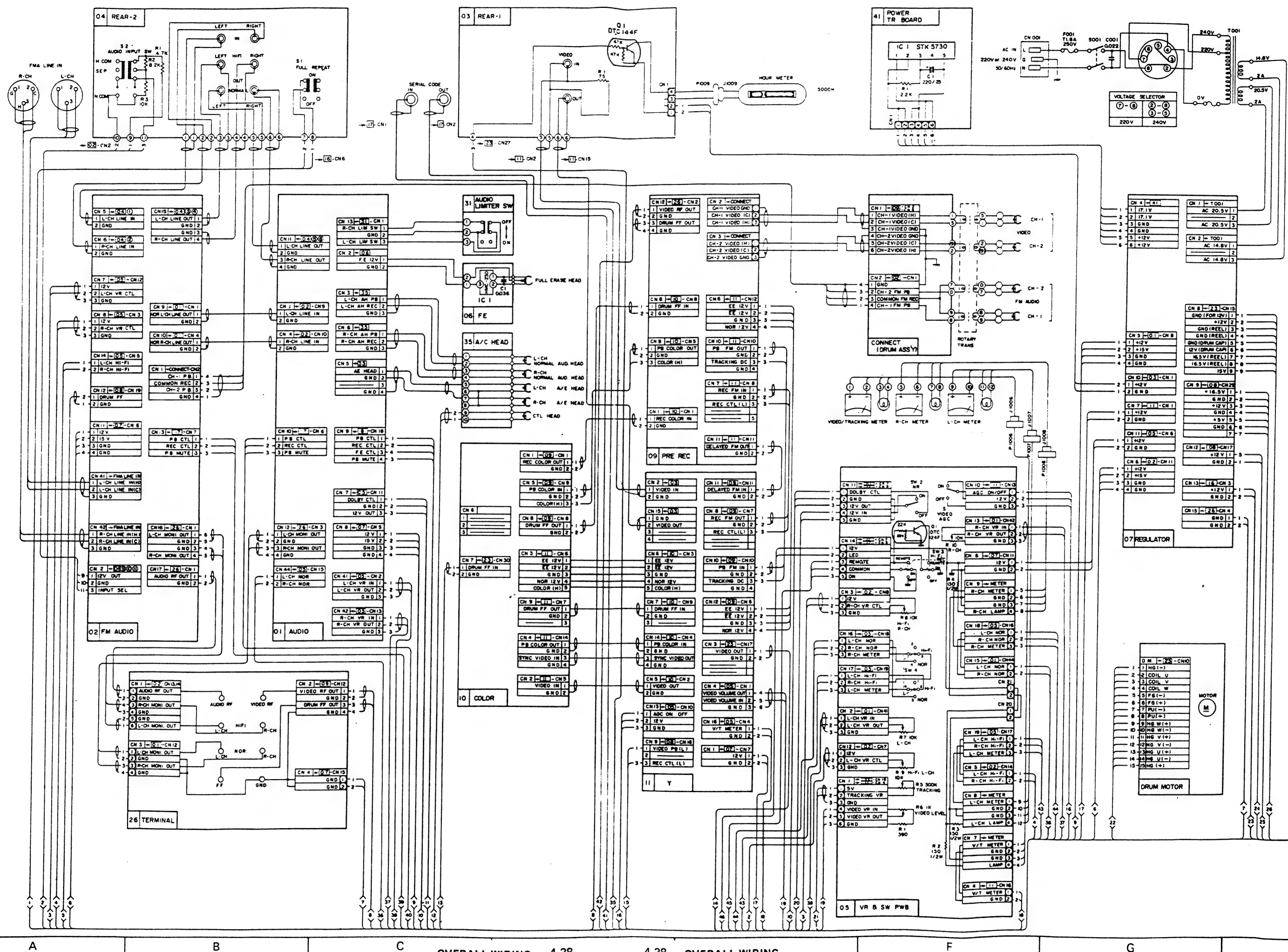


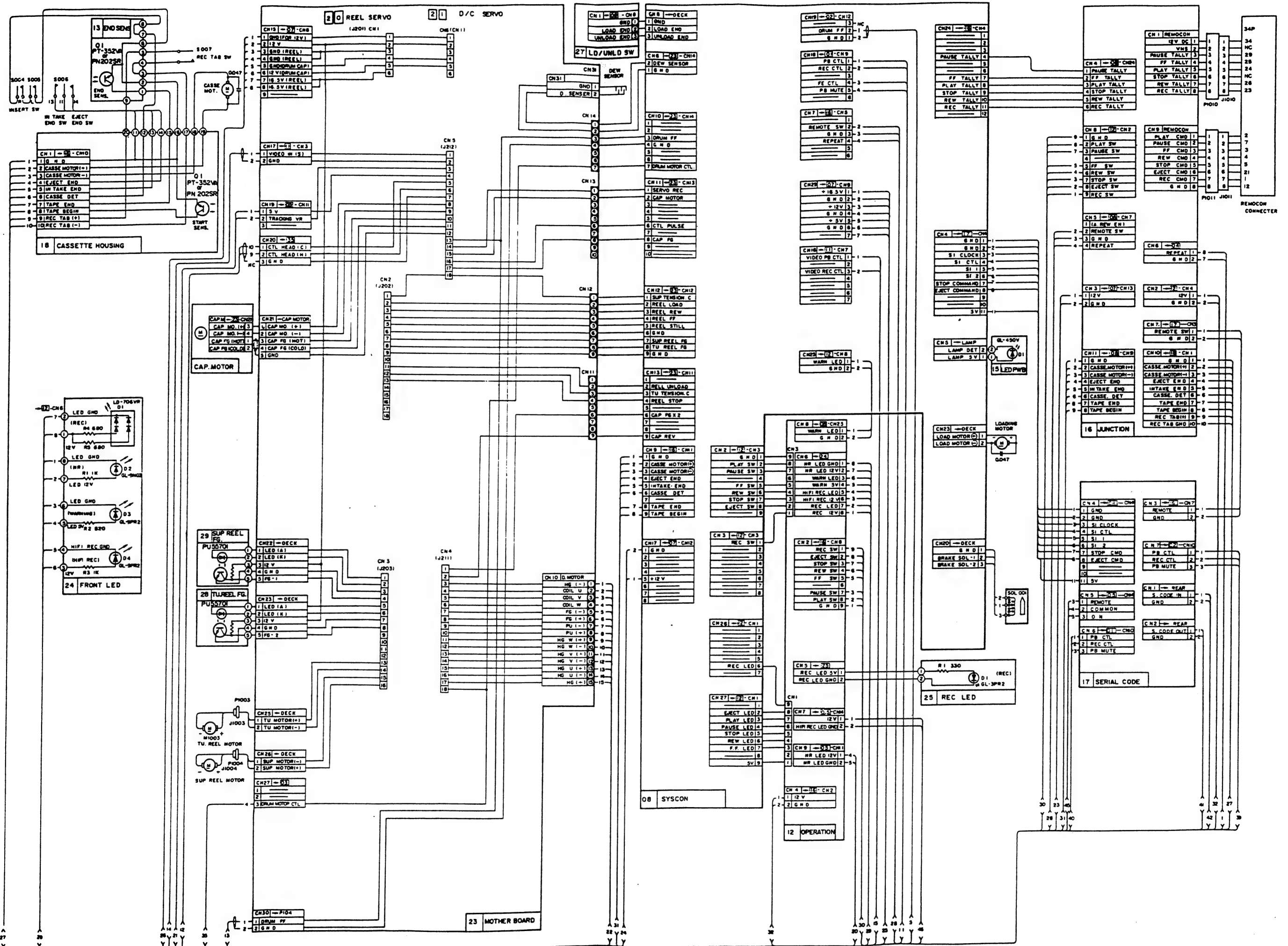
— UPPER DRUM —



4.38 MOTHER CIRCUIT BOARD



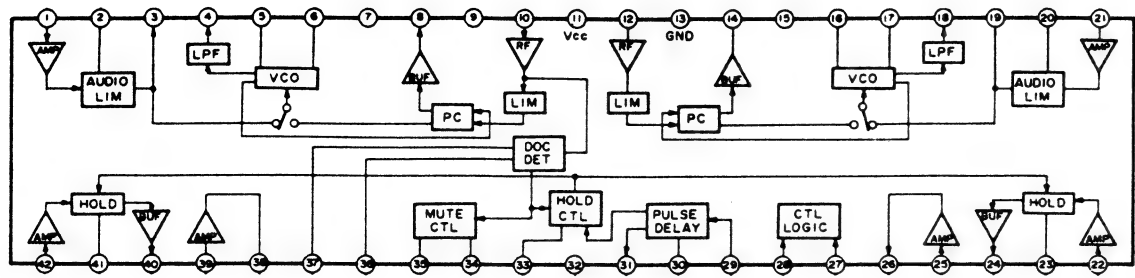




4.40 IC BLOCK DIAGRAMS

— AN3930K —

VTR Stereo FM REC/PB Circuit

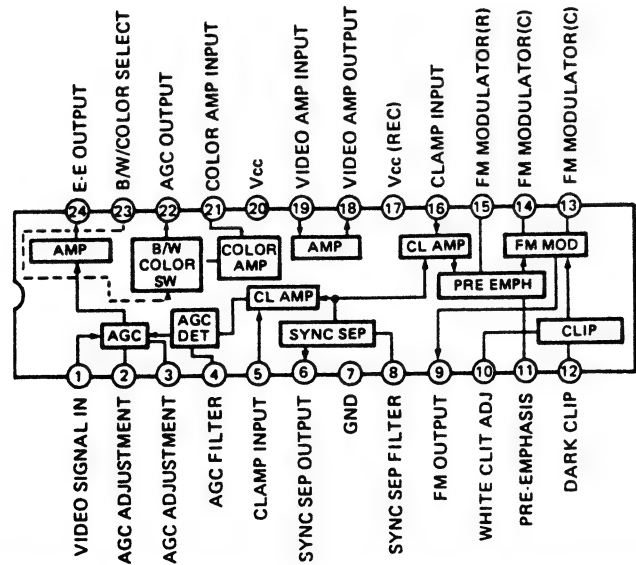


[AN3930K Terminal Description]

Pin No.	Description	Pin No.	Description	Pin No.	Description
1	REC IN (L)	15	VCO fo ADJ (R)	29	FF IN
2	A LIM ADJ (L)	16	VCO (R)	30	DFF ADJ
3	A LIM MON (L)	17	VCO (R)	31	DFF OUT
4	REC FM OUT (L)	18	REC FM OUT (R)	32	1/2 Vcc
5	VCO (L)	19	A LIM MON (R)	33	HOLD TIME ADJ
6	VCO (L)	20	A LIM ADJ (R)	34	MUTE CTL OUT
7	VCO fo ADJ (L)	21	REC IN (R)	35	MUTE TIME ADJ
8	FM DEMOD OUT (L)	22	HOLD IN (R)	36	DOC ADJ
9	GND (L)	23	HOLD (R)	37	DOC DET
10	RF IN (L)	24	HOLD OUT (R)	38	OUTPUT AMP OUT (L)
11	Vcc	25	OUTPUT AMP IN (R)	39	OUTPUT AMP IN (L)
12	RF IN (R)	26	OUTPUT AMP OUT (R)	40	HOLD OUT (L)
13	GND (R)	27	REC CTL	41	HOLD (L)
14	FM DEMOD OUT (R)	28	MODE CTL	42	HOLD IN (L)

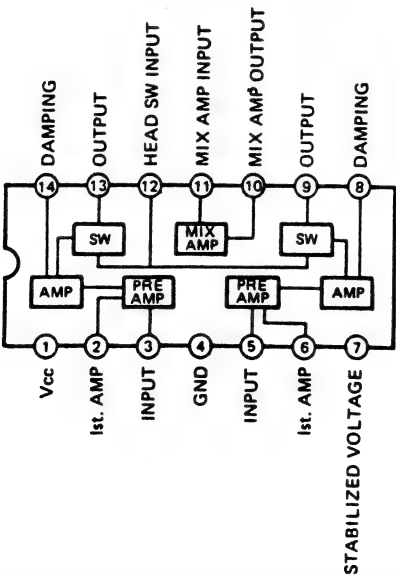
— AN6310 —

VTR Recoding Video Signal Processing Circuit



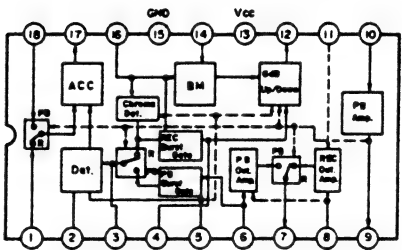
— AN6330 —

VTR Head Amplifier Circuit



— AN6360 —

VTR Color ACC Circuit

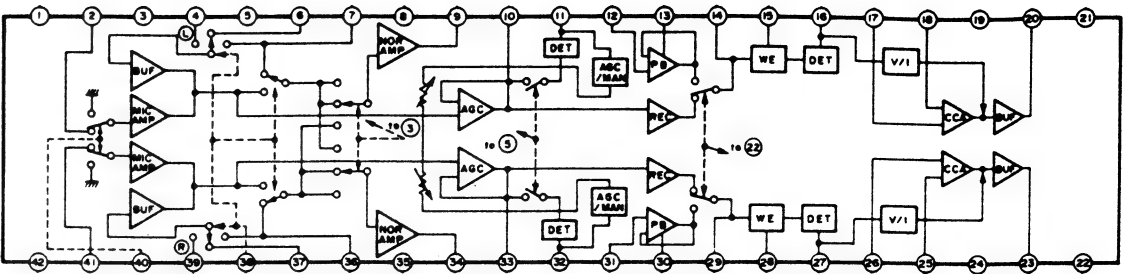


[Terminal Description]

Pin No.	Description	Pin No.	Description
1	ACC Rec. Input	10	P.B. Amp. Input
2	Burst Detect	11	Rec. Current Select
3	Burst Output	12	B.M. Output
4	Burst Gate Pulse Input	13	Vcc
5	Chroma Select Burst	14	Carrier Input
6	6dB up/down Select	15	GND
7	Output Amp. P.B. Chroma Input	16	Signal Input
8	Output Amp. Rec. Chroma Input C/B/W Select	17	ACC Output
9	P.B. Amp. Output R/P.B. Select	18	ACC P.B. Input

— AN6299NK —

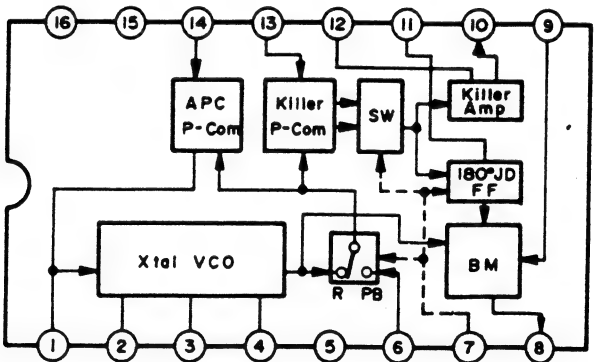
VTR Audio Signal Processing Circuit



[AN6299NK Terminal Description]

Pin No.	Description	Pin No.	Description	Pin No.	Description
1	GND	14	ENCODE OUT	30	NR AMP
2	MIC (Lch) IN	15	WEIGHTING	31	PB IN
3	NORM AUDIO OUT CTL	16	NR DET OUT	32	AGC DET OUT
4	AUX (Lch) IN	17	CCA + IN	33	ELEC. VR NR
5	AGC ON/OFF	18	CCA - IN	34	NORM AUDIO OUT
6	CAMERA (Lch) IN	19	CCA OUT	35	ELEC. VR CONTROL IN
7	TV (Lch) IN	20	MONITOR (Lch) OUT	36	TV (Rch) IN
8	ELEC. VR CONTROL INPUT	21	Vcc	37	CAMERA (Rch) IN
9	NORM AUDIO (Lch) OUT	22	REC/PB CTL	38	INPUT SELECT
10	ELEC. VR NF	23	MONITOR OUT	39	AUX (Rch) IN
11	AGC DET OUT	24	CCA OUT	40	MIC OUT CTL
12	PB AUDIO (Lch) IN	25	CCA - IN	41	MIC (Rch) IN
13	NR AMP	26	CCA + IN	42	STANDARD VOLTAGE

— AN6361N —

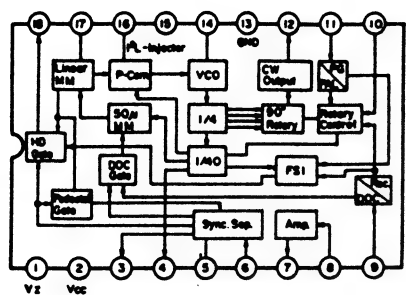


[Terminal Description]

Pin No.	Description	Pin No.	Description
1(1)	APC Filter	9(12)	630 kHz Input
2(3)	X'tal Osc.	10(13)	Killer Output
3(4)	X'tal Osc.	11(15)	ID Detect
4(5)	Vcc	12(16)	Killer Detect
5(6)	3.58 MHz Input	13(17)	Killer Burst Input
6(7)	Rec./P.B. Select	14(19)	APC Burst Input
7(9)	4.2 MHz Output	15(20)	GND

Note: Figures in () indicate pin numbers of AN6361NS.

— AN6362 —
VTR Color AFC Circuit

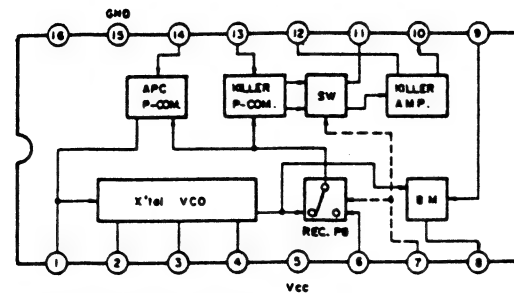


[Terminal Description]

Pin No.	Description	Pin No.	Description
1(1)	Zener Voltage	10(12)	ID Input
2(2)	Vcc	11(13)	PG Input (Head SW)
3(4)	Vss Output for V Sync.	12(15)	CW Output (630 kHz)
4(5)	Sync. Front Pulse Output	13(16)	GND
5(6)	Low Pass Filter	14(17)	VCO Control
6(7)	Sync. Sep. Input	15(18)	I ² L Injector
7(8)	White Clip Output	16(19)	P-Com. Filter
8(10)	Video Input	17(21)	Linear Mono. Multi.
9(11)	Rec./DOC Select	18(22)	HD-Output for Burst Gate

Note: Figures in () indicate pin numbers of AN6362S.

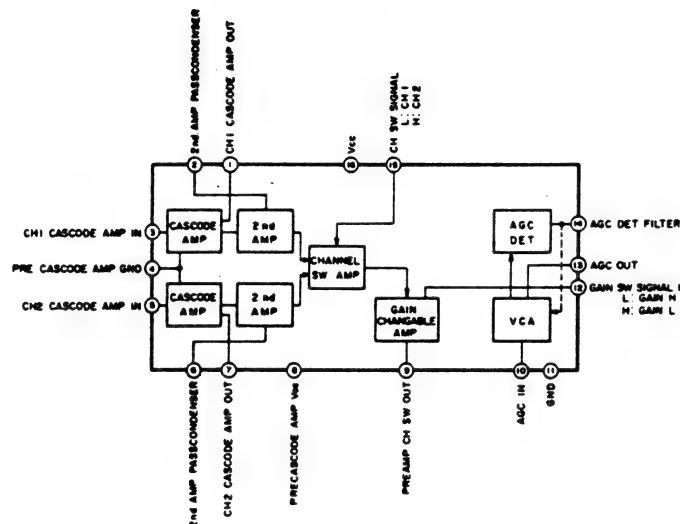
— AN6371 —
VTR Color APC Circuit



[Terminal Description]

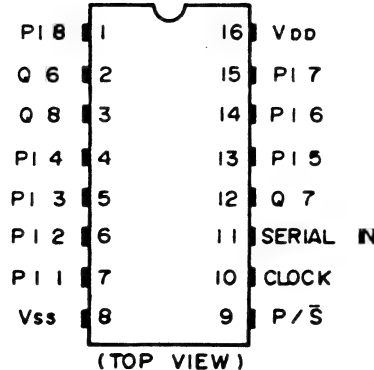
Pin No.	Pin Name	Pin No.	Pin Name
1	APC Filter	9	627 kHz Input
2	X'tal Oscillator	10	Killer Output
3	X'tal Oscillator	11	ID Detect
4	Vcc	12	Killer Detect
5	4.43 MHz Input	13	Killer Burst Input
6	Rec./P.B. Select	14	APC Burst Input
7	5.06 MHz Output	15	GND
8		16	Killer Filter

— HA11752 —
Preamp for FM Audio Signal



— HD14021B —

8-Stage Static Shift Register
(Asynchronous Parallel Input or Synchronous Serial Input/Serial Output)

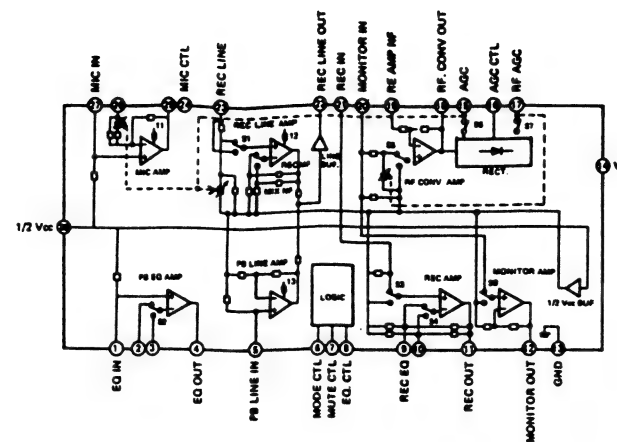


TRUTH TABLE

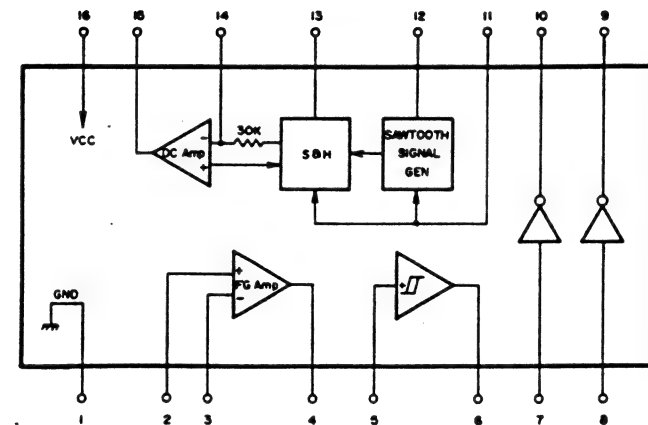
INPUTS				OUTPUTS Δ	
CLOCK Δ	P/S PI ₁	PI _n	SI	Q ₁	Q _n
⌊	L	*	L	L	Q _n - 1
⌊	L	*	H	H	Q _n - 1
⌊	L	*	*	*	No Change
⌊	H	L	L	L	L
⌊	H	L	H	L	H
⌊	H	H	L	L	L
⌊	H	H	H	H	H

n : 2 ~ 8
Δ : Q₁ ~ Q₅ Internal
⌊ : Level
* : Don't Care

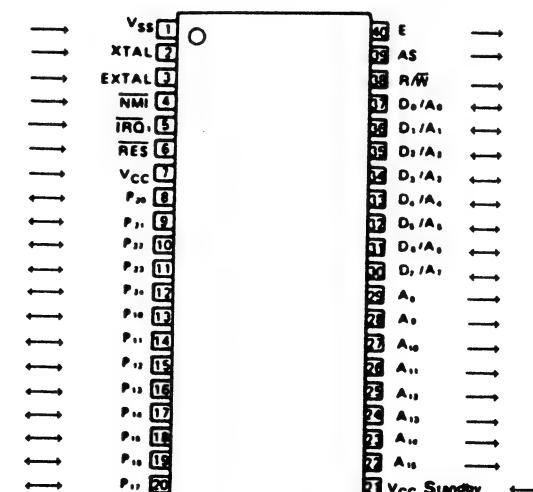
— AN6394 —
VTR Audio REC/PB Circuit



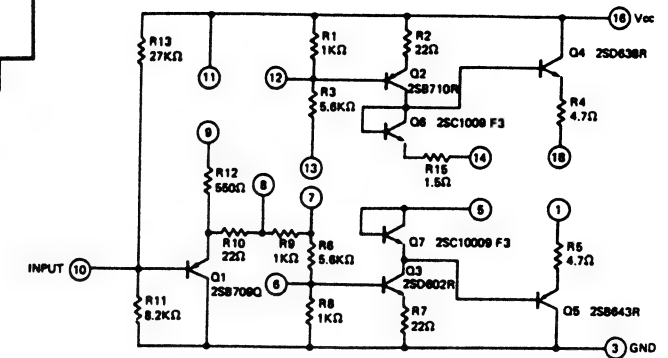
— BA6302A —
VTR Motor-Speed Control Circuit



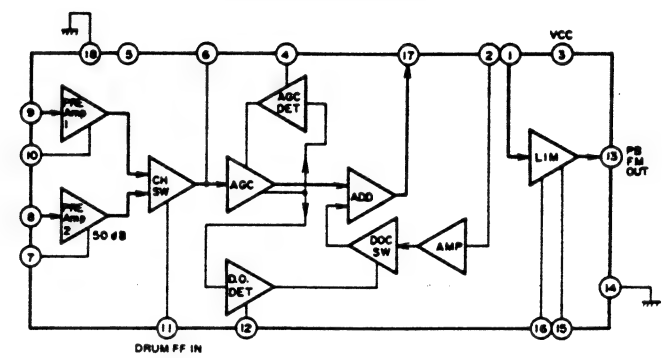
— HD6803P —
MPU (Micro Processing Unit)



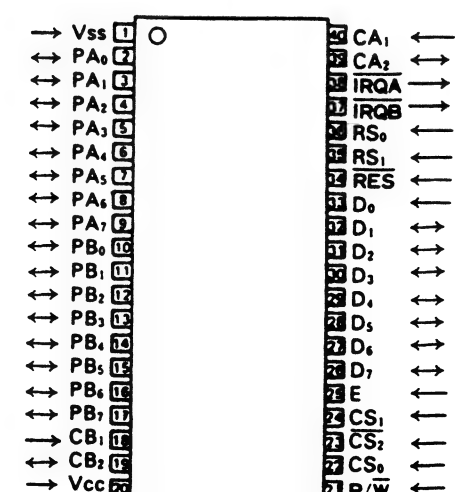
— EHM-822A29 —
REC. AMP



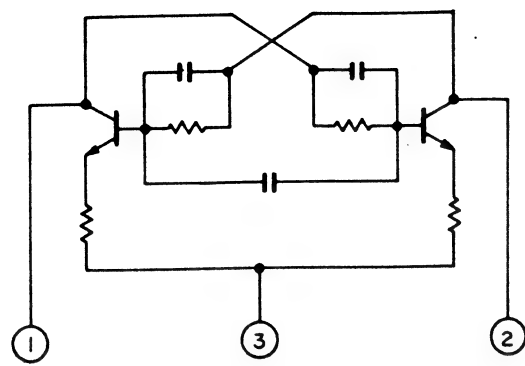
— HA11702 —
VTR PB Preamplifier



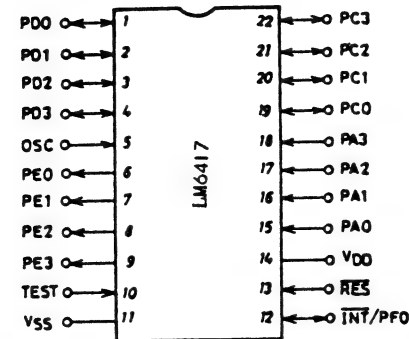
— HD6821P —
PIA (Peripheral Interface Adapter)



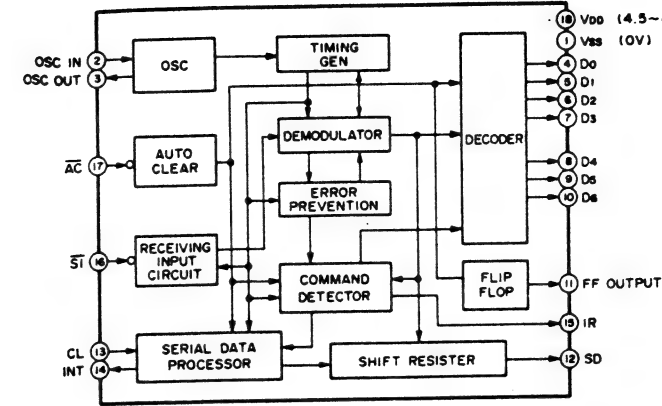
— HMC-230 —



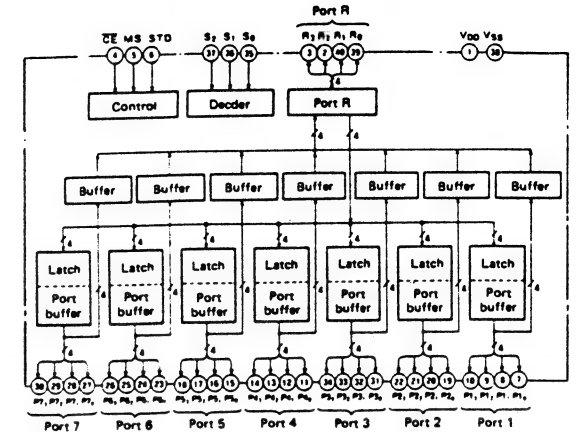
— LM6417E-297 —
Single-Chip 4-Bit Microcomputer



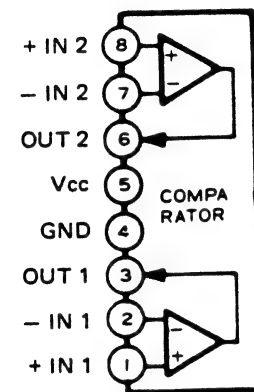
— M50117AP —
120 Function Remote-Control receiver



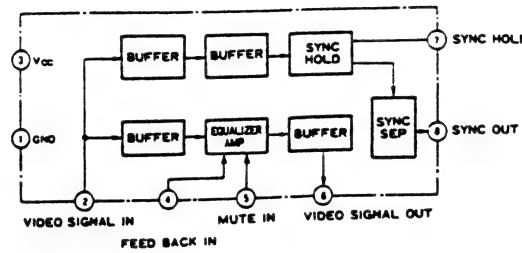
— M50782SP —
Input/Output Expander



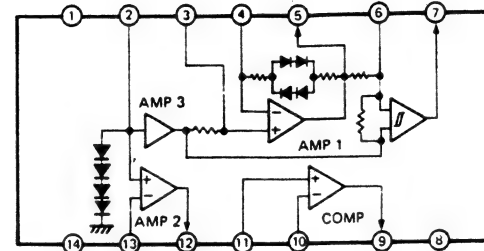
— M51207L —
Dual Comparator



— M51490L —
Video Equalizer

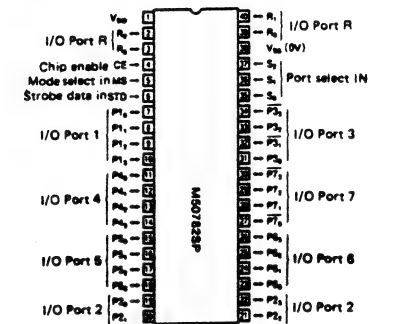


— M51796P —
Differential Amplifier & Schmitt Trigger

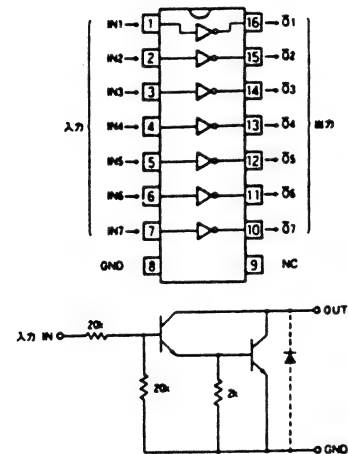


[Terminal Description]

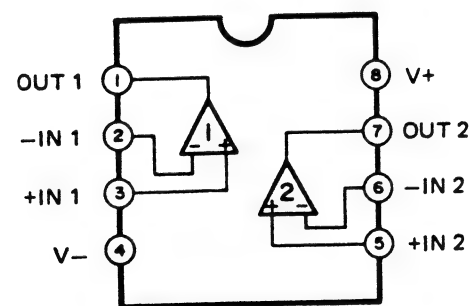
Pin No.	Description	Pin No.	Description
1	Standard Voltage	8	Vcc
2	AMP 1 + IN	9	Comparator Out
3	AMP 1 - IN	10	Comparator - In
4	AMP 1 OUT	11	Comparator + In
5	AMP 1 OUT	12	AMP 2 Out
6	Schmitt In	13	AMP 2 - In
7	Schmitt Out	14	GND 2



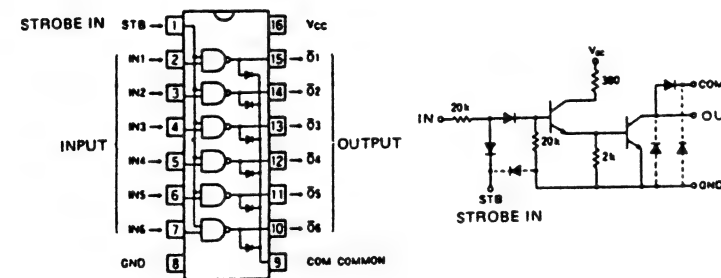
— M54519P —
7-Unit 400 mA Darlington Transistor Array



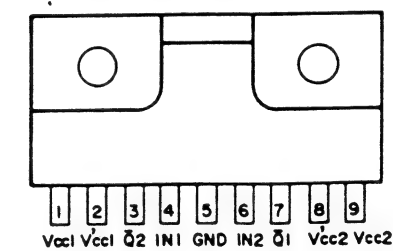
— M5218P —
Dual Low Noise Operational Amplifier



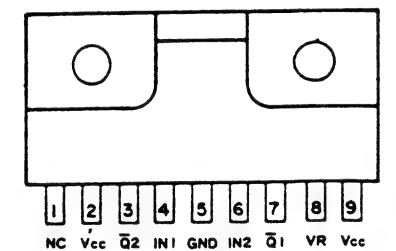
— M54533P —
6-Unit 320 mA Transistor Array with Clamp Diode and Strobe



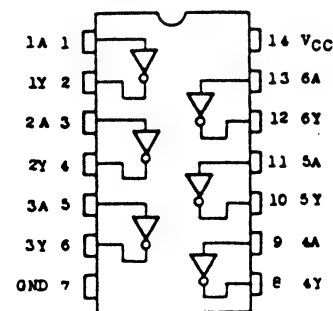
— M54544L —
Bi-directional Motor Driver



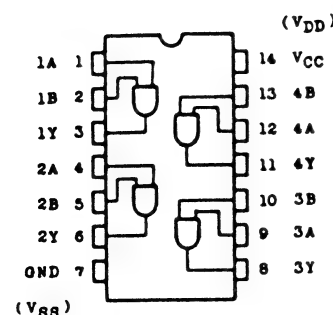
— M54644BL —
Bi-directional Motor Driver



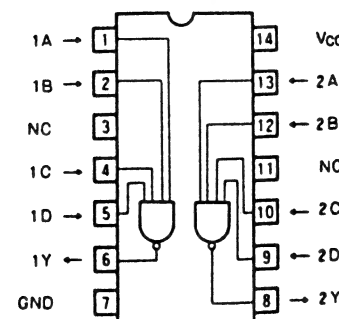
— M74LS04P —
Hex Inverter



— M74LS08P —
Quad 2-Input AND Gate



Dual 4-Input Positive NAND Gate



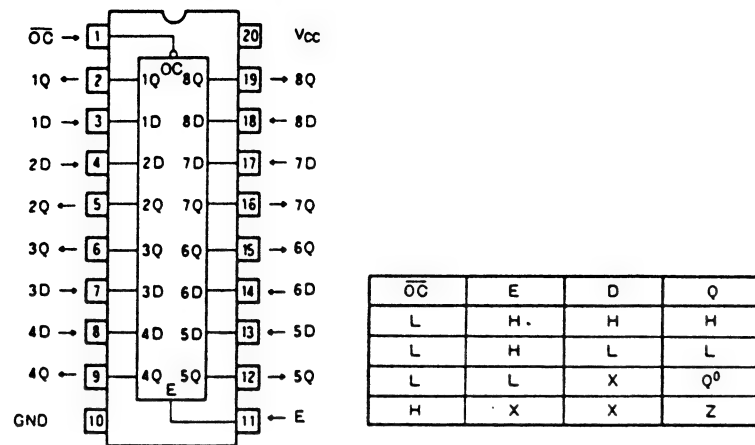
A	N	Y
L	L	H
H	L	H
L	H	H
H	H	L

$N = B \cdot C \cdot D$

INPUT		OUTPUT		NOTE
IN1	IN2	Q1	Q2	
L	L	OFF state	OFF state	OFF State
H	L	H	L	Drive
L	H	L	H	Reverse
H	H	L	L	Brake

INPUT		OUTPUT		NOTE
IN1	IN2	Q1	Q2	
L	L	OFF state	OFF state	OFF State
H	L	H	L	Drive
L	H	L	H	Reverse
H	H	L	L	Brake

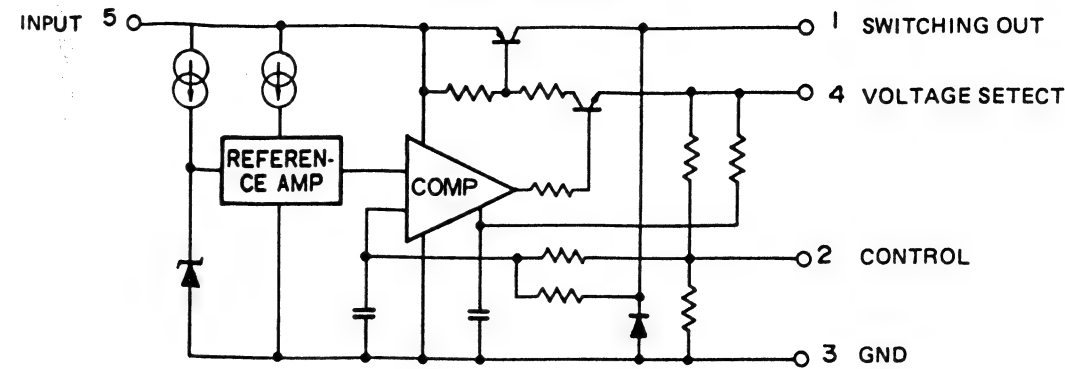
— M74LS373P —
Octal D-Type Transparent Latch With 3-State Output



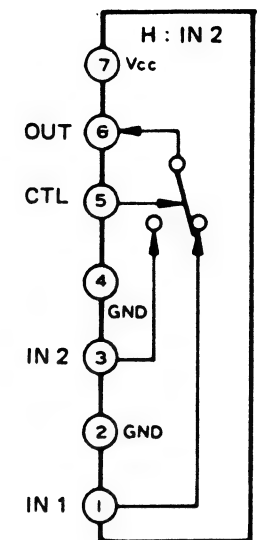
— NJM78L05D —
REGULATOR



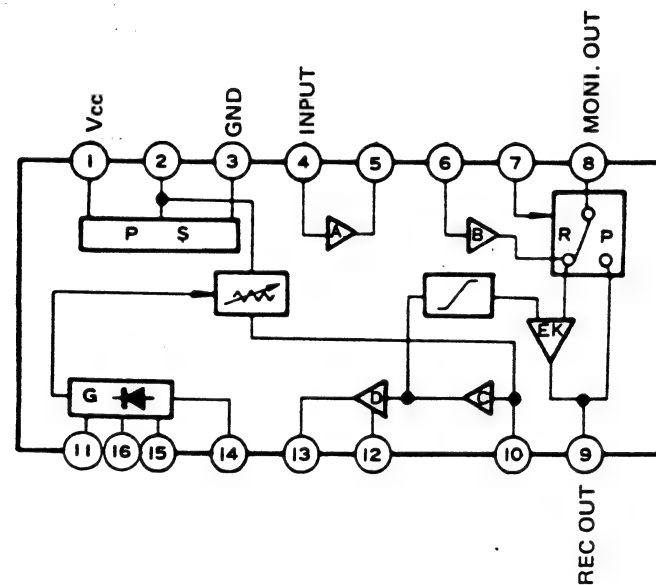
— STR2012A —
Chopper Regulator



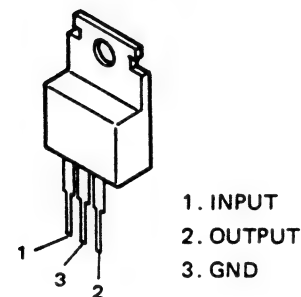
— TA7347P —
2-Input Switch



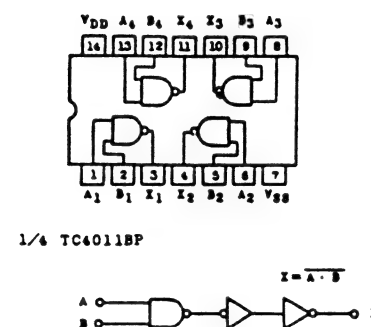
— TA7629P-A —
Dolby B Type Noise Reduction Processor



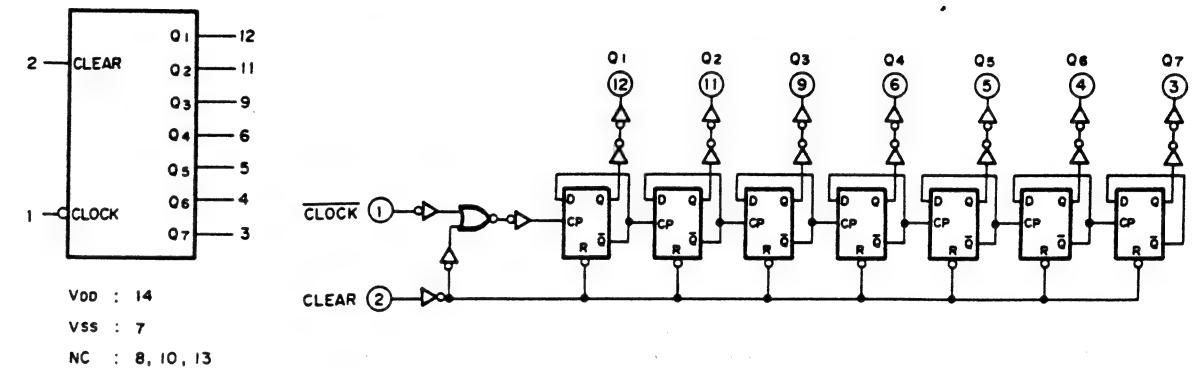
— TA78005AP —
REGULATOR



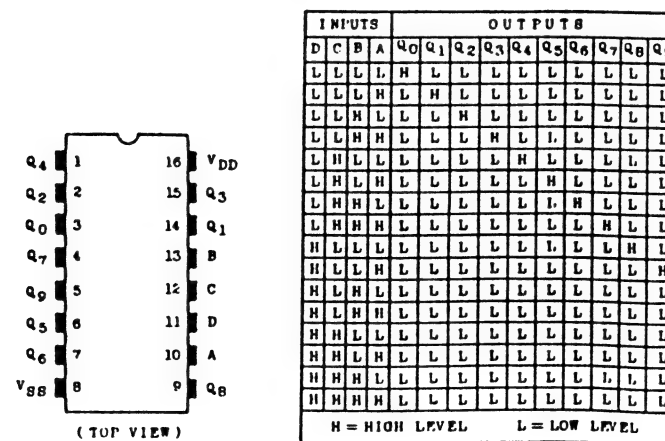
— TC4011BP —
Quad 2 Input NAND Gate



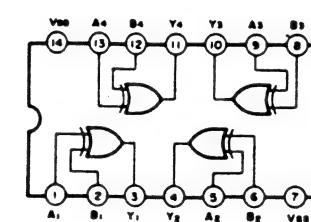
— TC4024BP —
7 Stage Ripple-Carry Binary Counter/Dividers



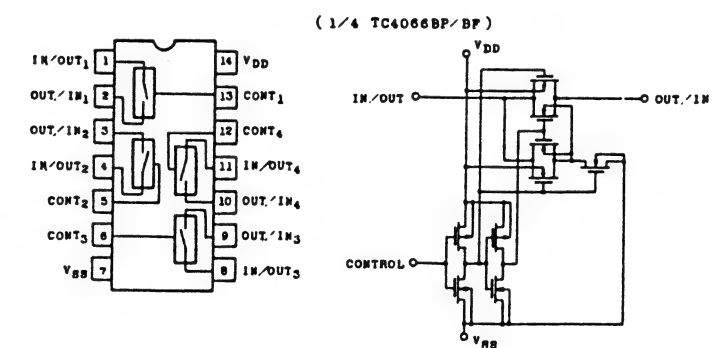
— TC4028BP —
BCD-To-Decimal Decoder



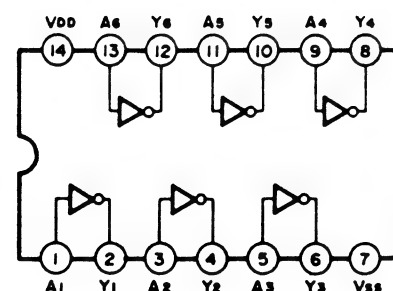
— TC4030BP —
Quad Exclusive-OR Gate



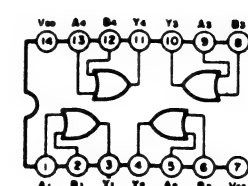
— TC4066BP —
Quad Bilateral Switch



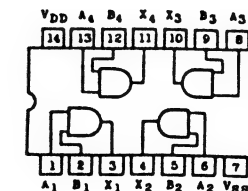
— TC4069UBP —
Hex Inverter



— TC4071BP —
Quad 2 Input OR Gate



— TC4081BP —
Quad 2 Input AND Gate



(TOP VIEW)

The diagram shows a 14-pin DIP package with pins numbered 1 through 14. Pins 1, 2, 3, 4, 5, 6, and 7 are connected to V+. Pins 8, 9, 10, 11, 12, 13, and 14 are connected to GND (V-). The package is shown in a perspective view with a notch on the left side.

The top diagram shows the physical layout of the 74181 ALU chip, a 16-pin DIP package. The pins are numbered 1 through 7 on the right side, and 14 through 16 on the left side. The bottom diagram is a detailed logic schematic of the ALU. It shows a complex network of logic gates, including AND, OR, and XOR gates, as well as flip-flops and registers. The schematic is organized into several functional blocks, with inputs and outputs clearly labeled. The diagram illustrates the internal structure of the ALU, showing how it performs arithmetic and logic operations on 4-bit data.

Pin diagram of the 74VHC00 hex inverters. The chip has 14 pins. Pins 1, 2, 3, 4, 5, and 6 are on the bottom edge, labeled T1, T2, C0, A1, B1, and Q1 respectively. Pins 7, 8, 9, 10, 11, and 12 are on the top edge, labeled Vss, Q2, B2, A2, C0, and T2 respectively. Pins 13 and 14 are on the left edge, labeled VDD and T1 respectively. A curved line on the left indicates that pins 13 and 14 are connected to pins 1 and 2.

(1/2) UPD4528BC)

VTR Digital Servo Controller

Pin No.	Description	Pin No.	Description	Pin No.	Description															
1	Vcc (5V)	17	DRUM PG IN	31	REV/FWD IN															
2	REC CTL PULSE	18	DRUM FG IN	32	S1 } <table border="1"> <tr> <td>Search speed</td><td>x1</td><td>x3</td><td>x5</td><td>x7</td></tr> <tr> <td>S2</td><td>L</td><td>L</td><td>H</td><td>H</td></tr> <tr> <td>S1</td><td>L</td><td>H</td><td>L</td><td>H</td></tr> </table>	Search speed	x1	x3	x5	x7	S2	L	L	H	H	S1	L	H	L	H
Search speed	x1	x3	x5	x7																
S2	L	L	H	H																
S1	L	H	L	H																
3	TEST	19	CAP FG IN																	
4	TRACKING FIX	20	CTL PULSE IN																	
5	TRACKING DELAY	21	GND	33	S2 }															
6	6/4/2 DELAY	22	SC IN (4.43 MHz)	34	DRUM AFC PWM OUT															
7	6/4/2 BIAS	23	SC OUT (4.43 MHz)	35	DRUM APC PWM OUT															
8	6H DELAY	24	CAPSTAN FG OUT	36	2/D/4															
9	4H DELAY	25	6(H)/4(M)/2(L) IN	37	CAP APC PWM OUT															
10	COMPOSITE SYNC IN	26	9H(H)/3H(L) IN	38	CAP AFC PWM OUT															
11	DRUM FF OUT	27	IN J	39	CAP APC MIX AMP IN															
12	FMA FF OUT	28	V. PULSE CTL IN (H : ON)	40	CAP AFC MIX AMP IN															
13	V. SYNC FF OUT	29	M1 } <table border="1"> <tr> <td></td><td>REC</td><td>ASB</td><td>INST</td><td>PB</td></tr> <tr> <td>M2</td><td>L</td><td>H</td><td>L</td><td>H</td></tr> <tr> <td>M1</td><td>L</td><td>L</td><td>H</td><td>H</td></tr> </table>		REC	ASB	INST	PB	M2	L	H	L	H	M1	L	L	H	H	41	CAP MIX AMP OUT
	REC	ASB	INST	PB																
M2	L	H	L	H																
M1	L	L	H	H																
14	V. PULSE OUT	42	GND																	
15	V. PULSE DELAY	30	M2 }																	
16	PG DELAY																			

SECTION 5 EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

Parts identified by the \triangle symbol are critical for safety.
Replace only with specified part numbers.

5.1 STANDARD PART NUMBER CODING

5.1.1 Screw coding	5-2
5.1.2 Fuse coding	5-3

5.2 EXPLODED VIEWS AND PARTS LIST

5.2.1 Packing assembly	5-3
5.2.2 Cabinet assembly	5-4
5.2.3 Chassis assembly	5-6
5.2.4 Mounting bracket assembly	5-8
5.2.5 Rear bracket assembly	5-10
5.2.6 Main-deck (1) assembly	5-12
5.2.7 Main-deck (2) assembly	5-14
5.2.8 Sub-deck assembly	5-16
5.2.9 Drum assembly	5-18
5.2.10 Cassette housing assembly	5-20

5.1 STANDARD PART NUMBER CODING

5.1.1 Screw coding

Standard screw part numbers are as follows.

Type of screw
(in capital letters)

1
Shape of screw head
(in capital letters)

2
Material
(in capital letters)

3
Nominal diameter
(in figures)

4
Length
(in figures)

5
Surface treatment
(in capital letters)

Shape of thread
(in capital letters)

Type of screw (first digit)

S Normal screws

D Assembled machine screws (with plain and spring washers)

L " (with spring washer)

N " (with plain washer)

F Feather screws

G Washer head tapping screws

M Wood screws

Shape of screw head (second digit)

B Brazier head

D Binding head

H Oval countersunk head

P Pan head

R Round head

S Flat head

T Truss head

W Washer head (machine screws)

X Toothed head

-Type of screw (first digit) -

- Shape of screw head (second digit) -

Material (third digit)

S Steel	N Nickel silver
E Stainless steel	Y Cast brass
C Cast iron	A Aluminum
U Copper	Z Zinc alloy
B Brass	K Polycarbonate
P Phosphor bronze	

Shape of thread (fourth digit)

P Cross recessed head screws

(-) Slotted head machine screws

X Slotted-cross recessed head machine screws

K Cross recessed head machine screws for precision equipment (type 1)

H " (type 3)

A Cross recessed head tapping screws (type 1)

B " (type 2)

C " (type 3)

E Cross recessed head special tapping screws (brand : evertight)

F " (brand : P-tight)

T " (brand : taptight)

G " (brand : taptight)

- Shape of thread (fourth digit) -

Nominal diameter (fifth and sixth digits)

The fifth and sixth digits are numbers indicating a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

Surface treatment (ninth digit)

Z Dichromate treatment after galvanizing (MFZn II-C)

N Nickel plating (MFNi II, MFNi I)

R Chromium plating (MBCr II, MBCr I)

G Silver plating (SP4)

B Black coating after plating

F Blackening of iron (FB)

M Blackening after galvanizing

K Pickling of brass (PF2)

P Phosphate treatment

W Uni-chrome plating

L Coating with transparent paint

A Coloring red after galvanizing (MFZn II-C)

C Coloring blue after galvanizing (MFZn II-C)

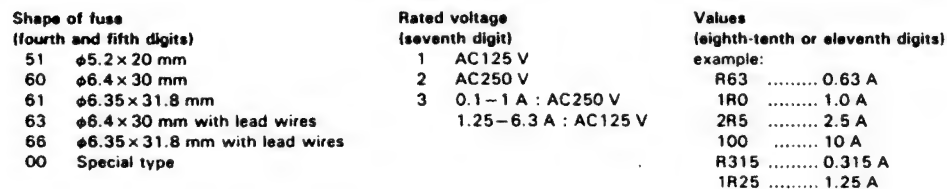
T Coloring green after galvanizing (MFZn II-C)

V Coloring purple after galvanizing (MFZn II-C)

Length (seventh and eighth digits)

The seventh and eighth digits are numbers indicating length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

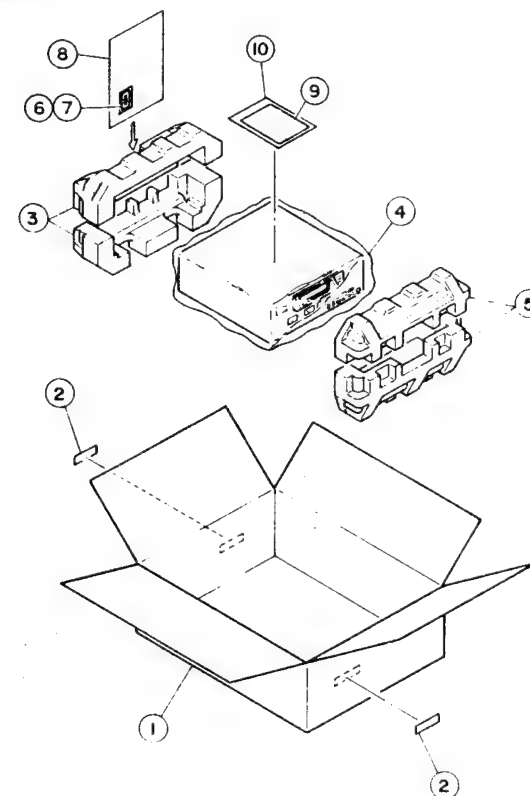
Standard fuse part numbers are as follows.



Characteristics (sixth digit)

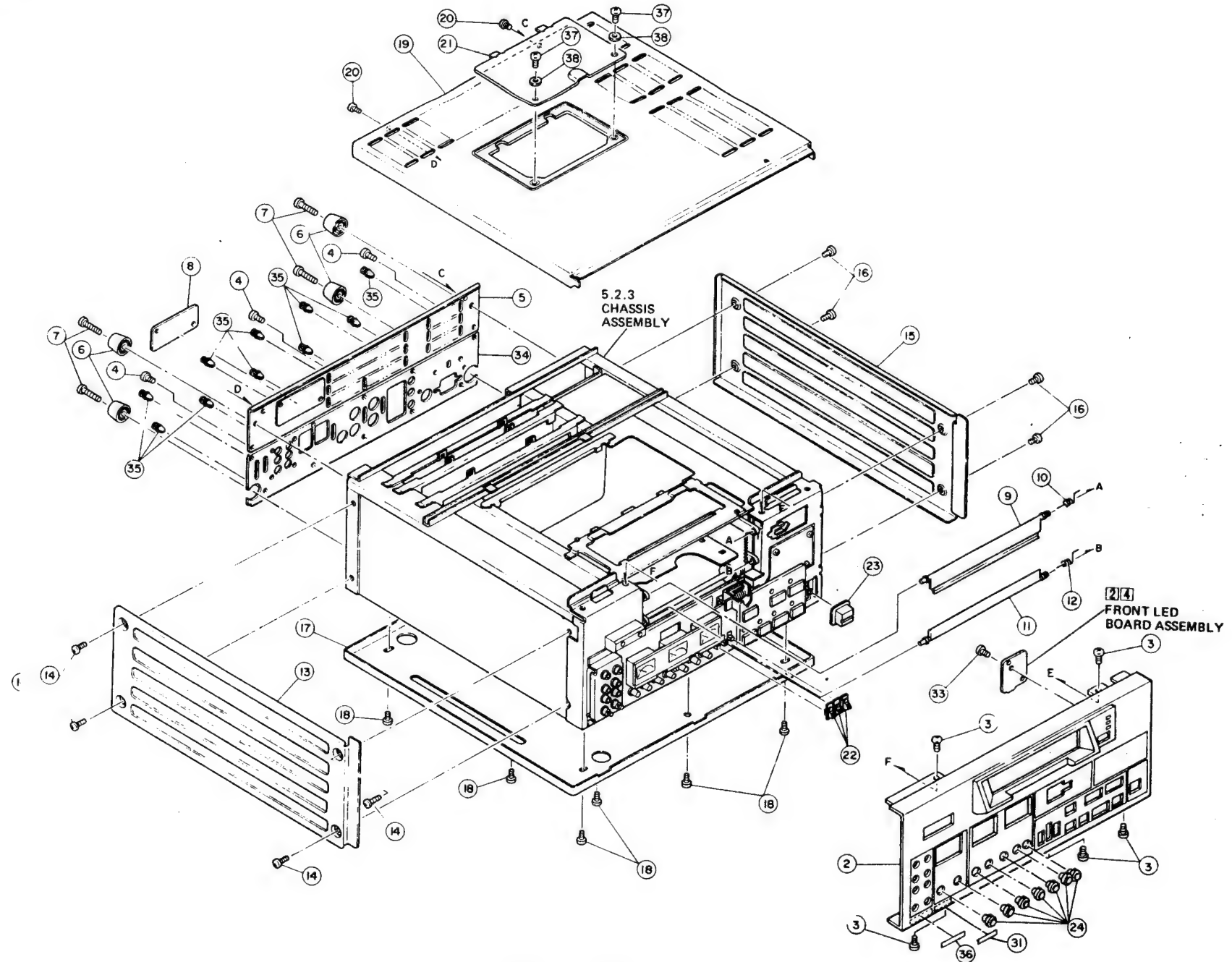
Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

5.2.1 Packing assembly

[illegible]

```
*****
*          PACKING ASSEMBLY          *
*****
```

1	PGD20025-25	PACKING CASE
2	PUP40619	SERIAL NO. STICKER, X2
3	PGD10014-1-2	REAR CUSHION
4	PUM30021-24	POLY BAG
5	PGD10013-1-2	FRONT CUSHION
6	PGZ00124	HOUR METER
7	PUP40003-10	AIR CAP
8	QPG8020-02804	POLY BAG
9	PGD30002-116	INSTRUCTIONS
10	QPG8024-03404	POLY BAG

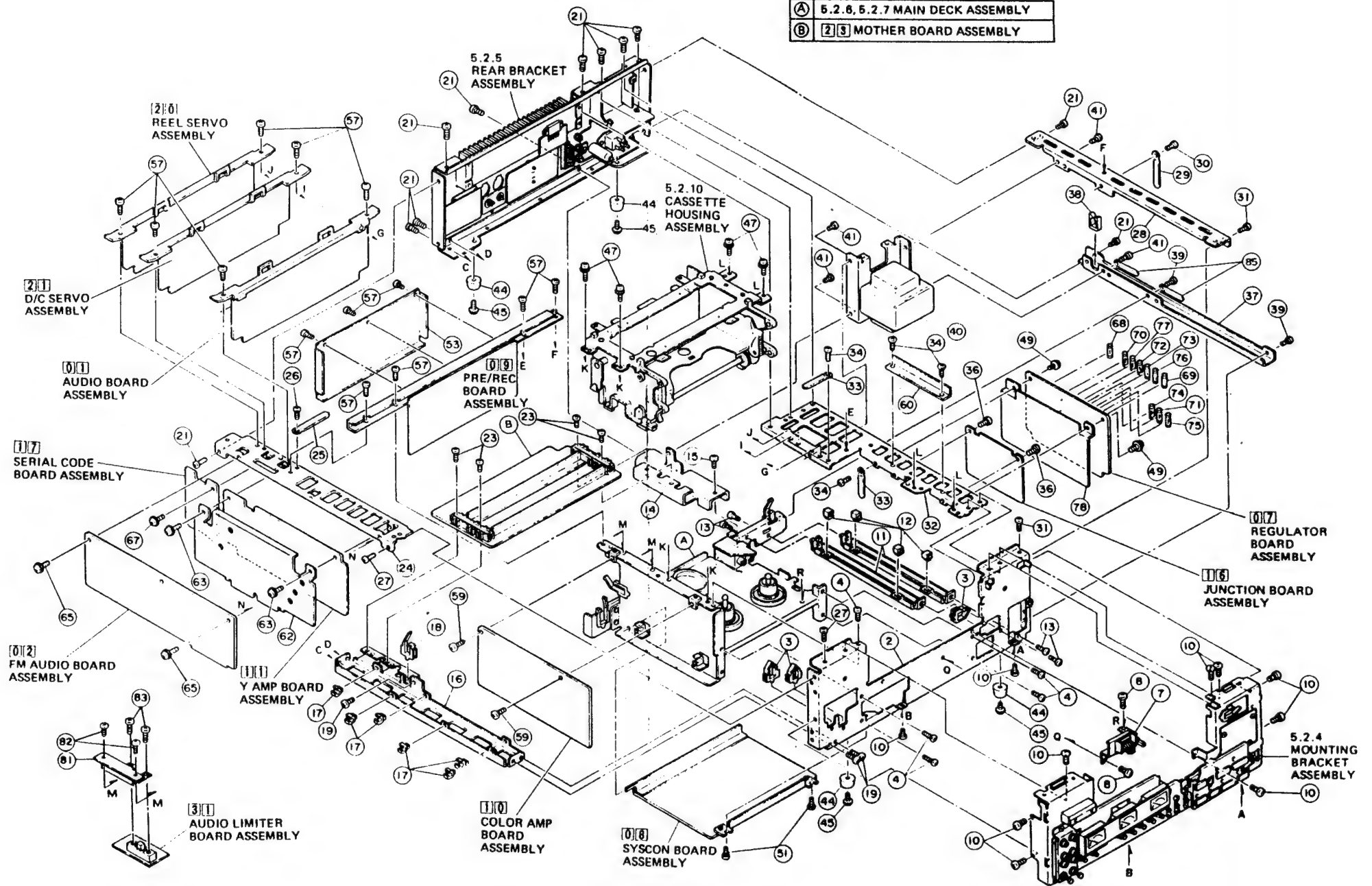


#	REF NO.	PART NO.	PART NAME, DESCRIPTION
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 * CABINET ASSEMBLY *

	2	PGD10027L	FRONT PANEL ASSY
	3	SDBP3006R	SCREW, X5
	4	SDBP3006M	SCREW, X3
Δ	5	PGD20026	REAR PANEL
Δ	6	QZF2319-001	FOOT, X4
	7	SDBP4018M	SCREW, X4
	8	PGD30018-22	SERIAL NO. PLATE
	9	PQ30107AA-19	U.DOOR ASS'Y
	10	PQ40104-2	U.TOR.SPRING
	11	PQ30030-2-15	L.DOOR
	12	PQ40472	L.TOR.SPRING
Δ	13	PGD20007	L.SIDE PANEL
	14	SDBP4006R	SCREW, X4
Δ	15	PGD20008	R.SIDE PANEL
	16	SDBP4006R	SCREW, X4
Δ	17	PU10364-04	BOTTOM COVER
	18	SBST3006Z	TH.TAP.SCREW, X6
Δ	19	PGD20034A-1	TOP COVER ASSY
	20	SDBP3006R	SCREW, X2
	21	PGD30155-1-2	COVER
	22	PGD40023	SLIDE KNOB, X3
	23	PGD40026	PUSH KNOB
	24	PU52482	VR KNOB, X7
Δ	31	TJL-000420	STICKER
	33	SBSF2606Z	SCREW
Δ	34	PGD20027-4-6	CONNECTOR PANEL
	35	PG200136	PLASTIC RIVET, X10
	36	PQ40111-1-5	SERIAL NO PLATE
	37	SDBP3006R	SCREW, X2
	38	PUM30017-6	SPACER, X2

(A)	5.2.6, 5.2.7 MAIN DECK ASSEMBLY
(B)	(2)(3) MOTHER BOARD ASSEMBLY

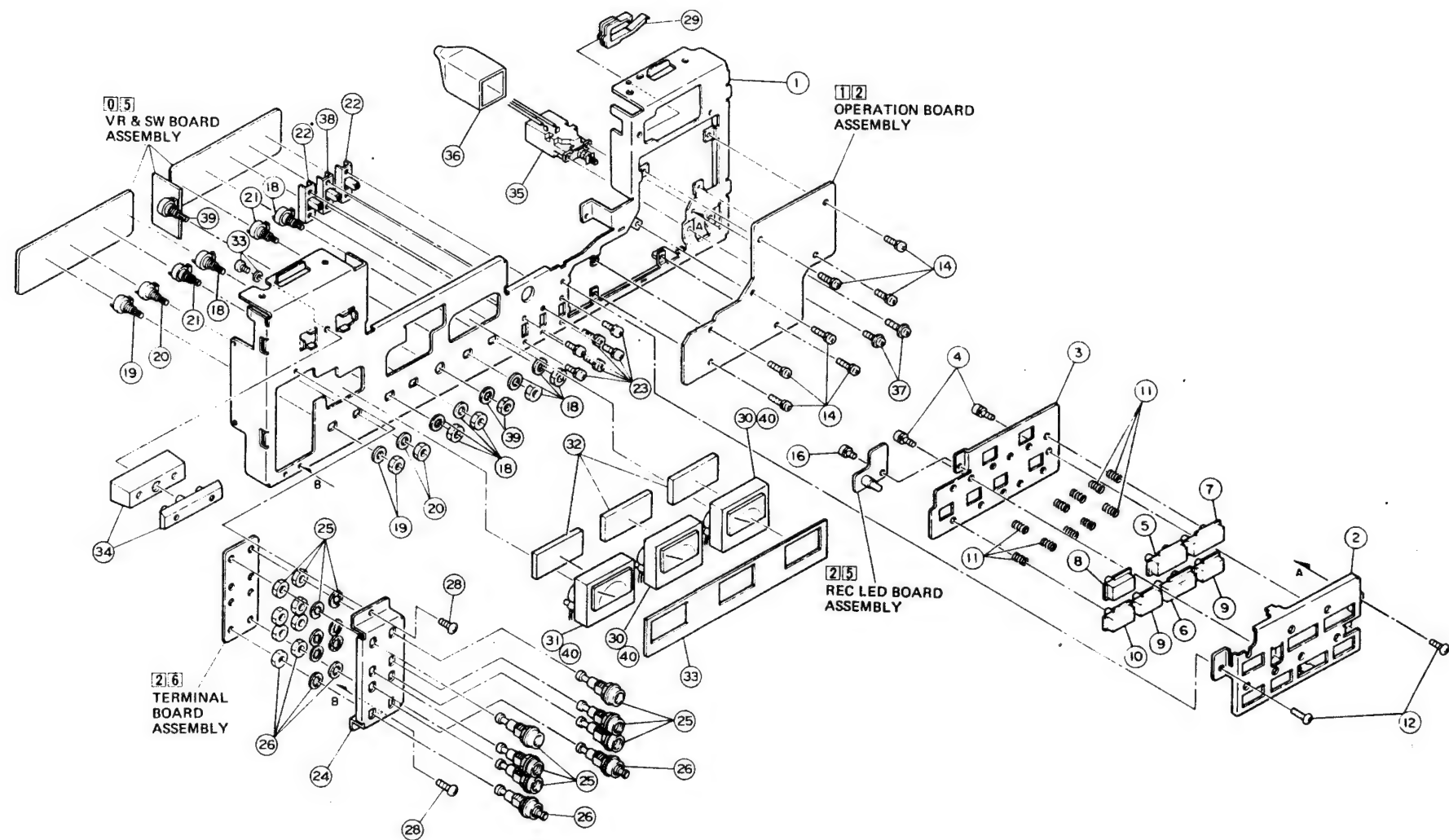


#	REF NO.	PART NO.	PART NAME, DESCRIPTION

* CHASSIS ASSEMBLY *			

	2	PGD10015B-3	FRONT BRACKET ASSY
Δ	3	PU49881	EDGE COVER, X3
	4	SBST3006Z	TH.TAP.SCREW, X5
	7	PGZ00112	COUNTER
	8	SBST3006Z	TH.TAP.SCREW, X2
	10	SBST3006Z	TH.TAP.SCREW, X11
	11	PU33027A-06	POWER PWB STAY ASSY, X2
Δ	12	PU47876	PWB HOLDER, X4
	13	SBST3006Z	TH.TAP.SCREW, X4
	14	PGD30115A-1	CENTER BRACKET (B) ASSY
	15	SBST3006Z	TH.TAP.SCREW
	16	PGD20017A-2	L.LOWER STAY ASSY
	17	PU47876	PWB HOLDER, X6
Δ	18	PU49881	EDGE COVER
	19	SBST3006Z	TH.TAP.SCREW, X3
	21	SBST3006Z	TH.TAP.SCREW, X11
	23	SBST3008Z	TH.TAP.SCREW, X4
	24	PU21514B-4	L.UPPER STAY ASSY
Δ	25	PU49485-2	WIRE CLAMP
	26	SBST3006Z	TH.TAP.SCREW
	27	SBST3006Z	TH.TAP.SCREW, X2
	28	PU21586A-2	R.UPPER STAY ASSY
	29	PU49485	WIRE CLAMP
	30	SBST3006Z	TH.TAP.SCREW
	31	SBST3006Z	TH.TAP.SCREW, X2
	32	PU21509B-11	CENTER UPPER STAY ASSY
Δ	33	PU49485-2	WIRE CLAMP, X2
	34	SBST3006Z	TH.TAP.SCREW, X4
	36	GBST3008Z	TH.TAP.SCREW, X2
	37	PU21590B-6	R.LOWER STAY ASSY
	38	PU48086	EDGE COVER
	39	SBST3006Z	TH.TAP.SCREW, X2
Δ	40	PGZ00126	POWER TRANSFORMER
	41	SBST3008Z	TH.TAP.SCREW, X4
Δ	44	QZF2115-002	FOOT, X4
Δ	45	SBST3010Z	TH.TAP.SCREW, X4
	47	DPSP3008Z	SCREW, X4
	49	GBST3008Z	TH.TAP.SCREW, X2

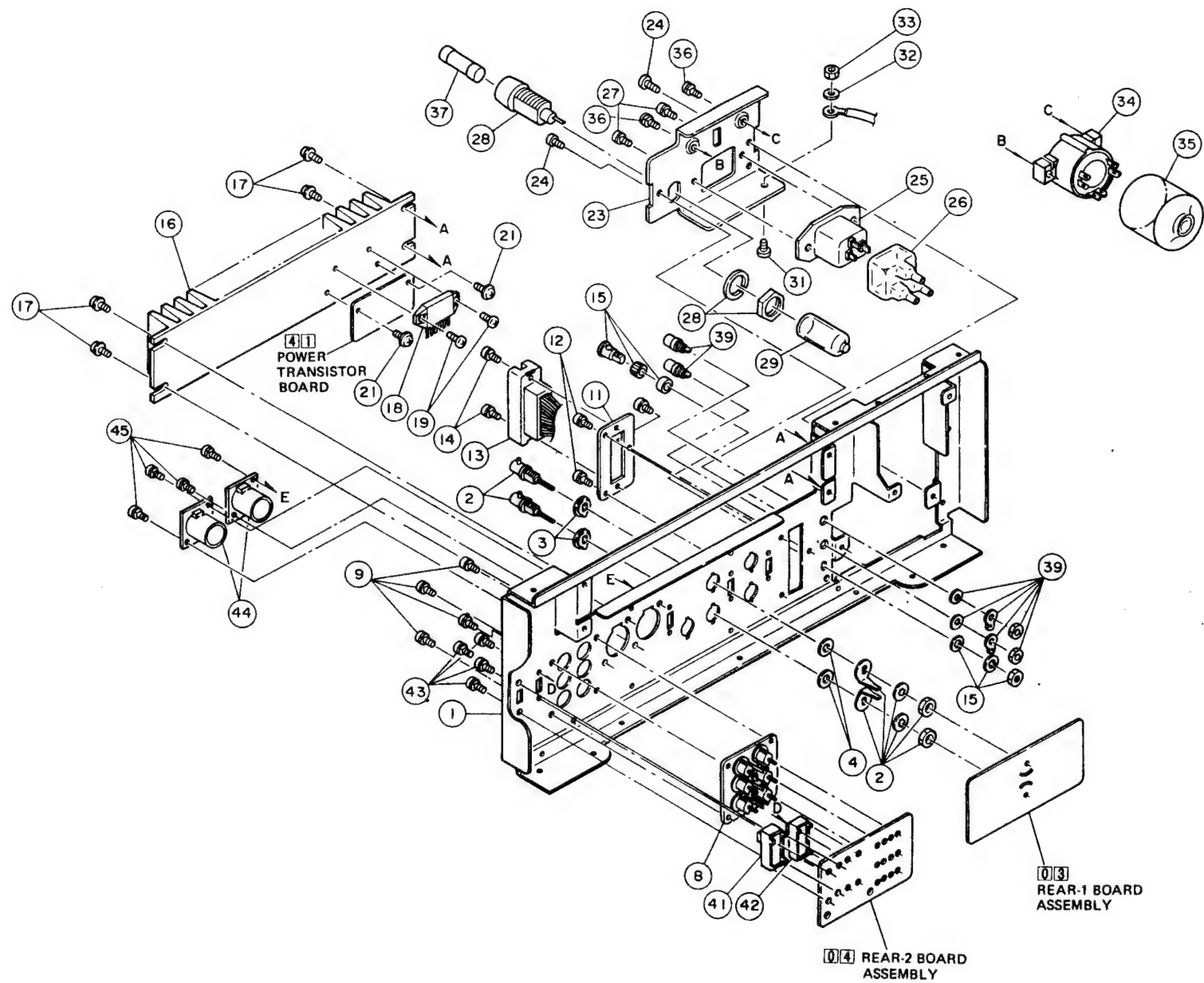
#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	51	SBST3006Z	TH.TAP.SCREW, X2
	53	PU33706B-2	PRE/REC SHIELD ASSY
	57	SBST3006Z	TH.TAP.SCREW, X13
	59	GBST3008Z	TH.TAP.SCREW, X2
	60	PGD40100	STAY
	62	PGD30117A	Y SHIELD ASSY
	63	GBST3008Z	TH.TAP.SCREW, X2
	65	GBST3008Z	TH.TAP.SCREW, X3
	67	GBST3008Z	TH.TAP.SCREW
Δ	68	QMF51E2-4R0	FUSE(F002)
Δ	69	QMF51E2-3R15	FUSE(F003)
Δ	70	QMF51E2-R63	FUSE(F004)
Δ	71	QMF51E2-R80	FUSE(F005)
Δ	72	QMF51E2-R80	FUSE(F006)
Δ	73	QMF51E2-R80	FUSE(F007)
Δ	74	QMF51E2-2R0	FUSE(F008)
Δ	75	QMF51E2-R63	FUSE(F009)
Δ	76	QMF51E2-1R0	FUSE(F010)
Δ	77	QMF51E2-R40	FUSE(F011)
	78	PGD30156	SHIELD PLATE
	81	PGD40206	SW BRACKET
	82	SBST3006Z	TH.TAP.SCREW, X2
	83	LPSP2604Z	SCREW, X2
	85	PU49485	WIRE CLAMP, X2



*△	REF NO.	PART NO.	PART NAME, DESCRIPTION

 * MOUNTING BRACKET ASSEMBLY *

1	PGD10024-01-04	MOUNTING BRACKET
2	PGD30153	KNOB PLATE(A)
3	PGD30154	KNOB PLATE(B)
4	LPSP2606Z	SCREW, X2
5	PGD40021-2	OPE.KNOB(A)
6	PGD40021-3	OPE.KNOB(A)
7	PGD40021-4	OPE.KNOB(A)
8	PGD40022-2	OPE.KNOB(B)
9	PGD40022-3	OPE.KNOB(B), X2
10	PGD40022-4	OPE.KNOB(B)
11	PGD30004-3	COMP.SPRING, X10
12	SBST3006Z	TH.TAP.SCREW, X2
14	LPSP2606Z	SCREW, X7
16	LPSP2606Z	SCREW
18	PGZ00023-001	V RESISTOR, X2
19	PGZ00023-002	V RESISTOR
20	PGZ00023-003	V RESISTOR
21	PGZ00023-06	V RESISTOR, X2
22	PGZ00016	SLIDE SWITCH, X2
23	LPSP2604Z	SCREW, X6
24	PGD40118	TERMINAL BRACKET
25	PGZ00106	TERMINAL, X6
26	PGZ00107	TERMINAL, X2
28	SBST3006Z	TH.TAP.SCREW, X2
△ 29	PU49881	EDGE COVER
△ 30	PU53866-5-5	METER, X2
△ 31	PU53866-4	METER
△ 32	PGD40056	CUSHION, X3
△ 33	PGD40146	SHEET
34	PGZ00124-2	HOUR METER BASE
△ 35	QSP2111-011	PUSH SWITCH
△ 36	PU54681	SWITCH COVER
37	DPSP3006Z	SCREW, X2
38	PGZ00017	SLIDE SWITCH
39	PU50638	ROTARY SW
40	PU53866-LAMP	METER LAMP, X3

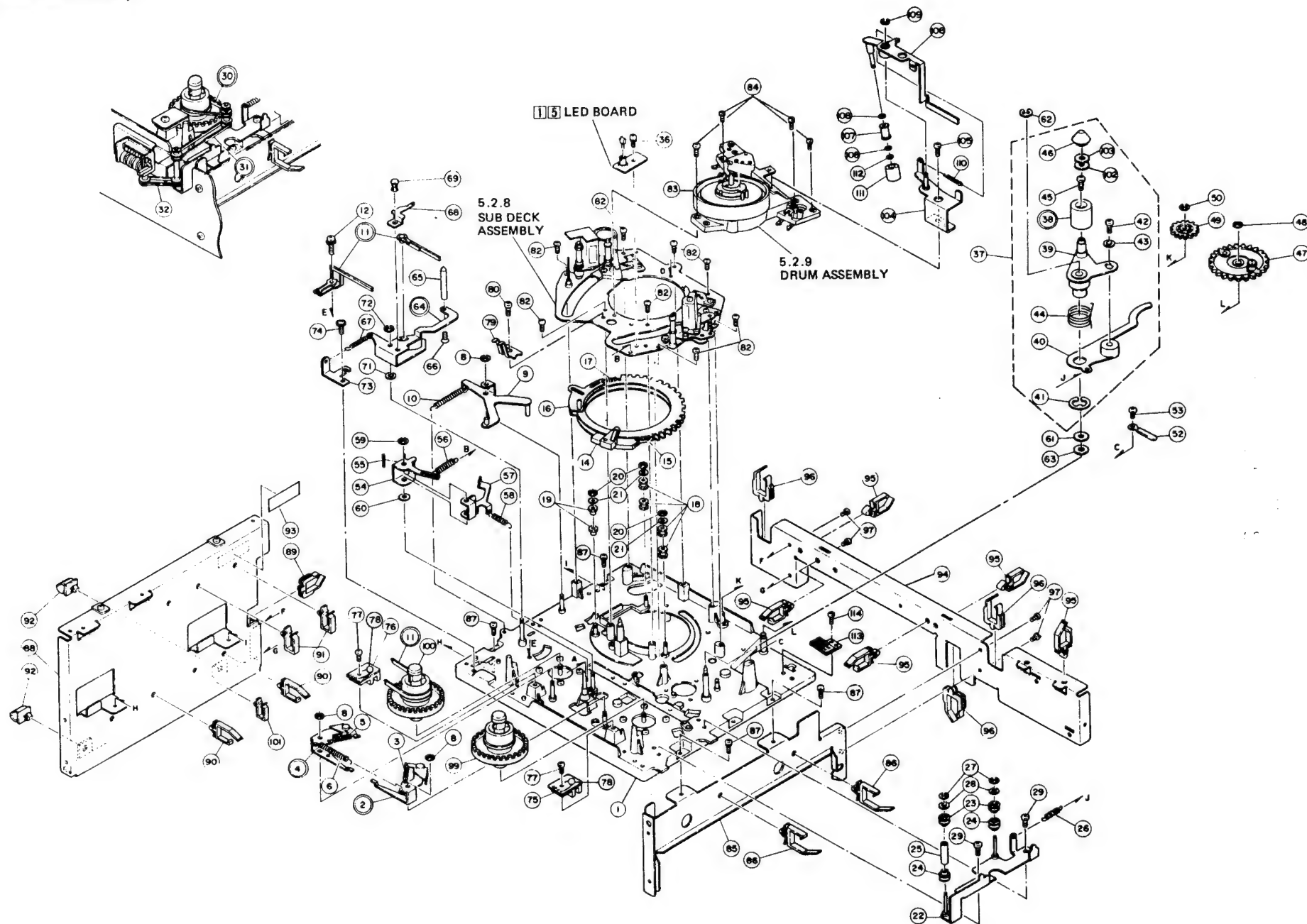


*△ REF NO. PART NO. PART NAME, DESCRIPTION

* REAR BRACKET ASSEMBLY *

1	PGD10025-1-4	REAR BRACKET
2	PU51213	BNC CONNECTOR, X2
3	PU48611	RING, X2
4	Q03093-439	WASHER, X2
8	PGZ00108	JACK ASSY
9	LPSP3006Z	SCREW, X4
11	PGD40121-2	PLATE
12	LPSP3006Z	SCREW, X3
13	PGD40262B	CONNECTOR ASSY
14	LPSP2610Z	SCREW, X2
15	PGZ00110	EARTH TERMINAL
△ 16	PGD30159	HEAT SINK
17	GBST3008Z	TH.TAP.SCREW, X4
△ 18	STK5730	IC
19	SDSP3012Z	SCREW, X2
21	GBST3008Z	TH.TAP.SCREW, X2
△ 23	PGD3020Z	POWER BRACKET
24	LPSP3008Z	SCREW, X2
△ 25	PGZ00818	AC CONNECTOR
△ 26	PU52931	CONNECTOR COVER
△ 27	LPSP3008Z	ASSY SCREW, X2
△ 28	QMG0301-003	FUSE HOLDER
△ 29	PU50316	FUSE COVER
△ 31	SDBP4008N	SCREW
32	WLS4000N	L.WASHER
△ 33	NNB4000N	NUT
△ 34	QSR0085-004	VOLTAGE SELECTOR
△ 35	PU54680	VOLTAGE SELECTOR COVER
△ 36	LPSP3008Z	ASSY SCREW, X2
△ 37	QMF51E2-1R6	FUSE(F001)
39	PGZ00134	RCA JACK ASS'Y, X2
41	PGZ00017	SLIDE SWITCH
42	PGZ00016	SLIDE SWITCH
43	LPSP2604Z	SCREW, X4
44	PU53563-6	XLR CONNECTOR, X2
45	SPBP2606R	SCREW, X4

5.2.6 Main deck (1) assembly



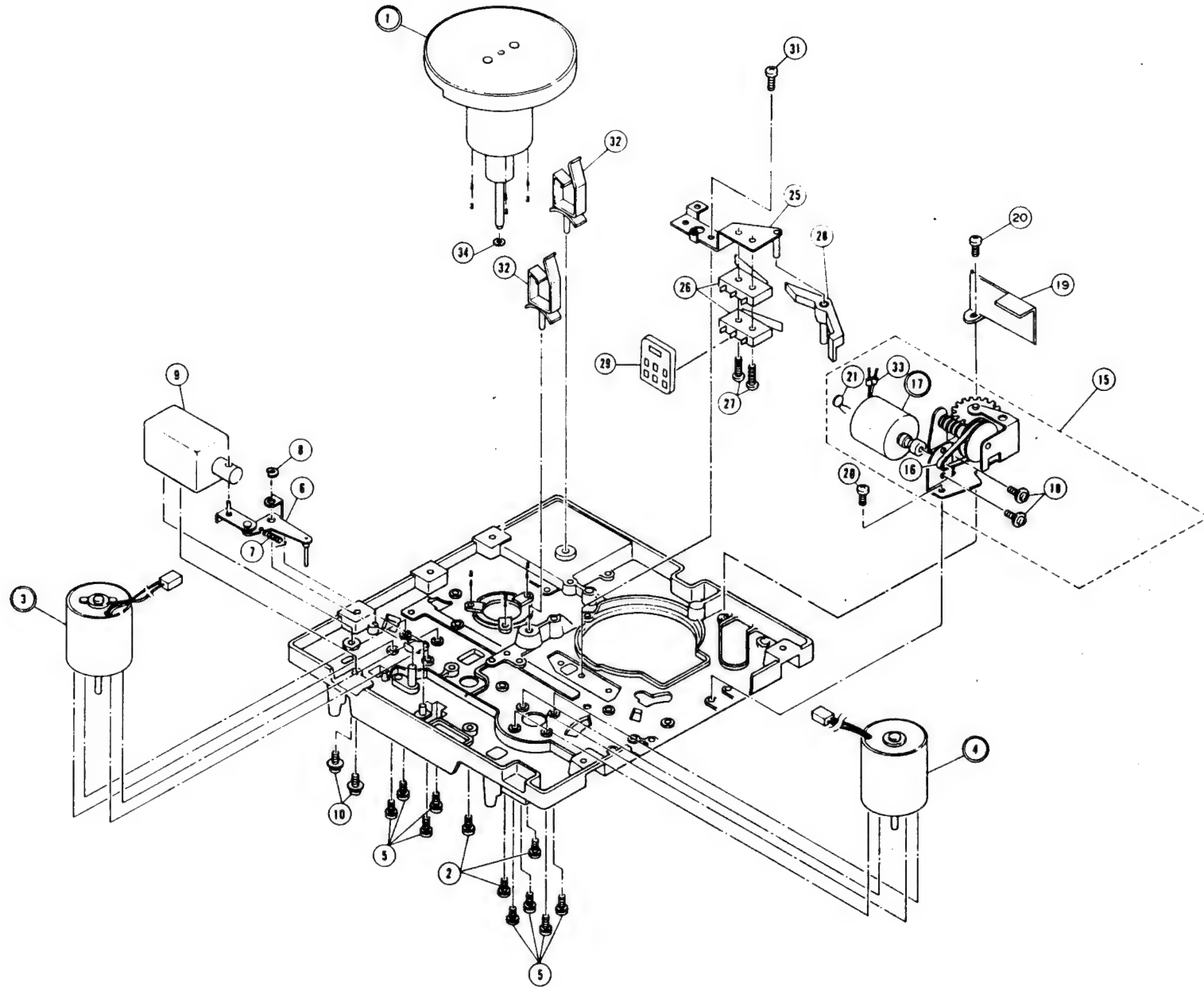
Δ REF NO. PART NO. PART NAME, DESCRIPTION

 * MAIN DECK ASSEMBLY(1) *

1	PU21159C-07	MAIN DECK ASSY
2	PU50535D	BRAKE ASSY
3	PRD30024-2	SPRING
4	PU50535C	BRAKE ASSY
5	PUM30001-47	SPRING
6	PUM30001-29	SPRING
8	REE3000	"E"RING, X3
9	PU50545A-5	CANCEL LEVER ASSY
10	PUM30001-32	SPRING
11	PU51390A	TENSION BAND ASSY
12	DPSP3008Z	SCREW
14	PU48838D	DRIVE RING ASSY(T.U.)
15	PU35005-81	SPRING
16	PU48837B	DRIVE RING ASSY(SUP.)
17	PU35005-81	SPRING
18	PU48711	PULLEY, X4
19	PU50758	PULLEY, X2
20	REE3000	"E"RING, X3
21	Q03093-818	WASHER, X3
22	PRD40075A	COUNTER HOLDER ASSY
23	PRD40082	COUNTER PULLEY, X2
24	PRD40082-2	COUNTER PULLEY, X2
25	PRD40083	COUNTER PIPE
26	PUM30001-13	SPRING
27	REE1500	"E" RING, X2
28	Q03093-838	WASHER, X2
29	SBST3008Z	TH.TAP.SCREW, X2
30	PRD40084-1	COUNTER BELT
31	PRD40084-2	COUNTER BELT
32	PRD40084-3	COUNTER BELT
36	LPSP3004Z	SCREW
37	PRD40060A-05	PINCH ROLLER ASSY
38	PQ40137A	PINCH ROLLER ASSY
39	PRD40062	PINCH ROLLER ARM ASSY
40	PRD40066A-01	P.R.PRESSUR ARM ASSY
41	REE8000	E.WASHER
42	DPSP3006Z	SCREW
43	PRD40061	COLLAR
44	PRD40069	COIL SPRING
45	LPSP2604Z	SCREW
46	PRD40104	P.ROLLER CAP
47	PRD40070B	P.ARM D.GEAR ASSY
48	REE3000	"E"RING
49	PRD40073	IDLE GEAR
50	REE2500	"E" RING
Δ 52	PU49485	WIRE CLAMP
53	SBST3006Z	TH.TAP.SCREW

Δ REF NO. PART NO. PART NAME, DESCRIPTION

54	PRD40096A	SUB BRAKE ASSY
55	PRD40010	PAD
56	PGD30003-6	SPRING
57	PRD40098A	RELEASE ARM ASY
58	PGD30003-7	SPRING
59	REE3000	"E"RING
60	Q03093-818	WASHER
61	Q03093-836	WASHER(T=0.25)
62	REE5000	E.RING
63	Q03093-844	WASHER(T=0.13)
64	PRD40085B	TENSION ARM ASSY
65	PU44852-2	TENSION POLE
66	SSSP2605Z	SCREW
67	PRD30024-36	TENSION SPRING
68	PRD40091-01-04	E.P.STOPPER
69	E48729-009	PLASTIC RIBET
71	Q03093-830	WASHER
72	REE1500	"E" RING
73	PRD40074-01-01	SPRING HOLDER
74	NPSP3008Z	ASSY SCREW
75	PU55701	PHOTO INTERRUPT(T.U.)
76	PU55701	PHOTO INTERRUPT(SUP.)
77	SBST3008Z	TH.TAP.SCREW, X2
78	QCF11HP-223	CAPACITOR, X2
79	PRD40300	EARTH PLATE
80	SBST3008Z	TH.TAP.SCREW
82	SBST3008Z	TH.TAP.SCREW, X8
84	LPSP3010Z	SCREW, X4
85	PGD20014A	C.L.STAY ASS'Y
Δ 86	PU54969	WIRE CLAMP, X2
87	LPSP3008Z	ASSY SCREW, X4
88	PGD20015A-2	L.S.BKT ASS'Y
89	PU49881	EDGE COVER
Δ 90	PU54969-2	WIRE CLAMP, X2
91	PU48016	MINI CLAMP, X2
Δ 92	PU47876	PWB HOLDER, X2
93	PU42091	NO.PLATE
94	PGD20016A-3	C.BKT (A) ASS'Y
Δ 95	PU54969-2	WIRE CLAMP, X5
96	PU49881	EDGE COVER, X3
97	SBST3006Z	TH.TAP.SCREW, X4
99	PGZ00896A	REEL DISK ASSY(T.U.)
100	PGZ00897A	REEL DISK ASSY(SUP.)
101	PU48016-2	MINI CLAMP
102	Q03093-816	WASHER(T=0.5)
103	Q03093-841	WASHER(T=0.25)
104	PRD40511A-01	BRACKET ASSY
105	DPSP3006Z	SCREW
106	PRD40505A-02	CLEANER ARM ASSY
107	PRD40509	CLEANER ARM ASSY
108	Q03093-829	WASHER, X2
109	REE2500	"E" RING
110	PRD30024-8	SPRING
111	PRD40510-01-02	CLEANER
112	PUM30017	SLIT WASHER
113	PU56637B	DEW SENSOR ASSY
114	SDST2606Z	TAPPING SCREW

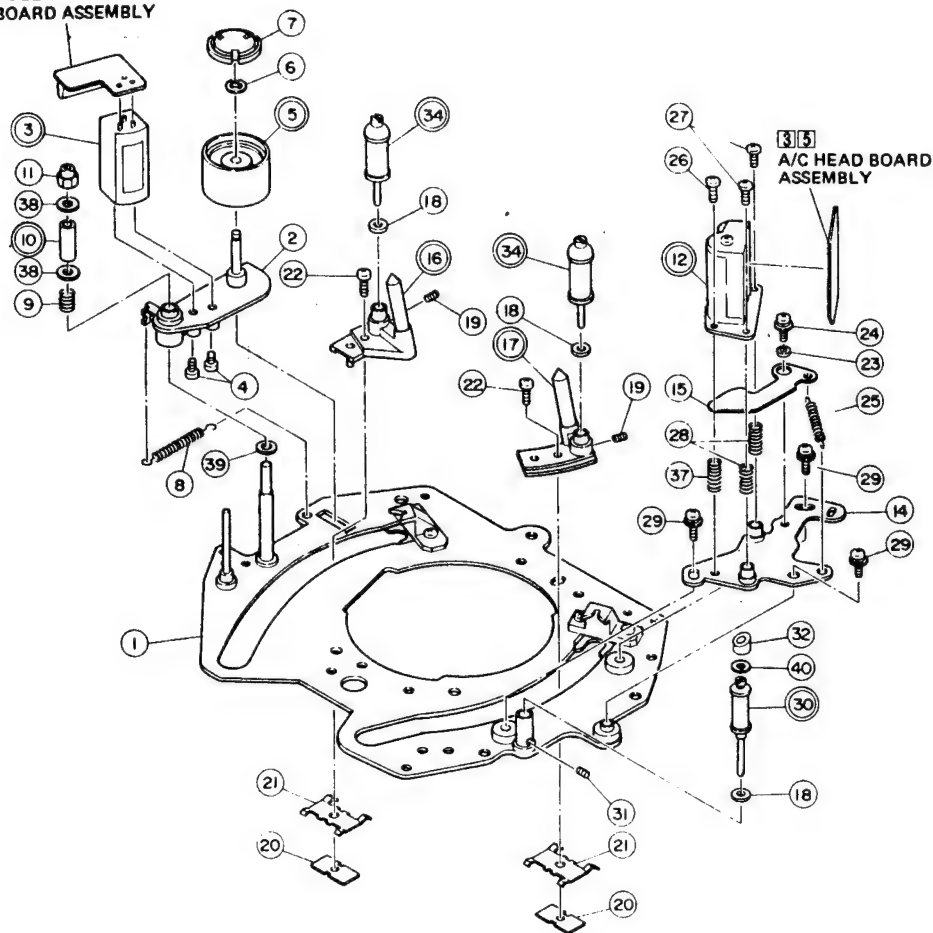


*△ REF NO. PART NO. PART NAME, DESCRIPTION

 * MAIN DECK ASSEMBLY(2) *

△ 1	PGZ00877	CAPSTAN MOTOR
2	LPSP3008Z	SCREW, X3
△ 3	PGZ00895	REEL MOTOR(T.U.)
△ 4	PGZ00895	REEL MOTOR(SUP.)
5	LPSP3006Z	SCREW, X8
6	PU50538A	CONNECT LEVER ASSY
7	PUM30001-6	SPRING
8	REE3000	"E"RING
△ 9	PGZ00092	SOLENOID
10	DPSP3008Z	SCREW, X2
15	PGZ00032A-1	LOADING DRIVE ASSY
16	PU50350	BELT
△ 17	PU52745A	DC MOTOR ASSY
18	LPSP2604Z	SCREW, X2
19	PGD40135	GEAR COVER
20	SBST3008Z	TH.TAP.SCREW, X2
△ 21	QCF11HP-473	CAPACITOR
25	PU48952A-3	SW.BRACKET ASSY
26	QSM1S11-211	MICRO SWITCH, X2
27	SP8P2316N	SCREW, X2
28	PU48955	SW.LEVER
29	PGE40069-1-1	LD/UNLD SW PWB
31	SBST3006Z	TH.TAP.SCREW
△ 32	PU54969-2	WIRE CLAMP, X2
△ 33	PU45811	FERRITE BEADS, X2
34	PRD40524	S.WASHER

016

FULL ERASE HEAD
BOARD ASSEMBLY

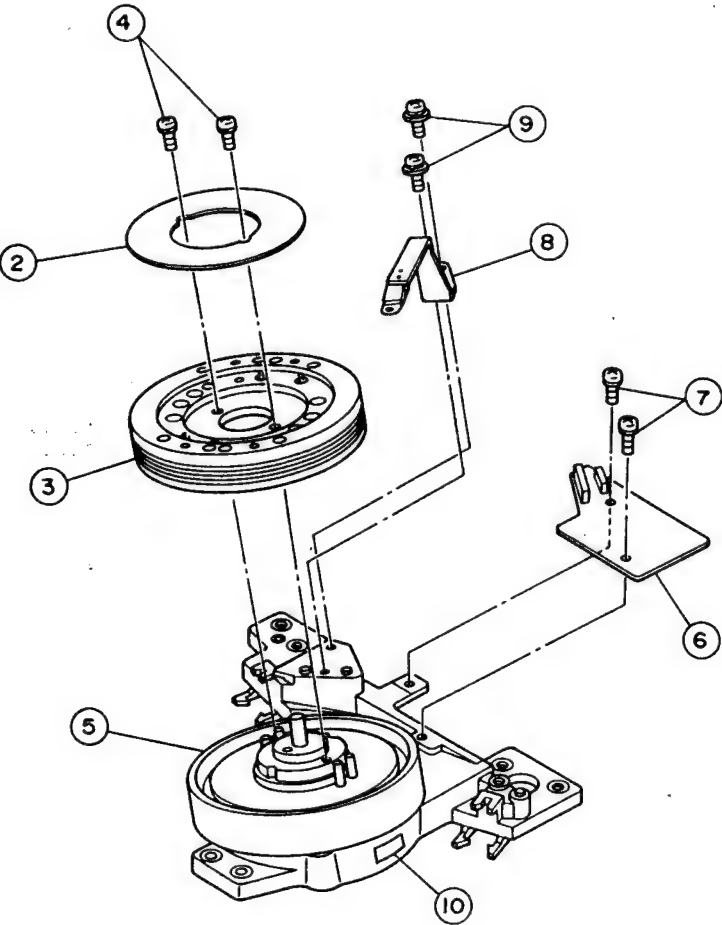
#A REF NO. PART NO.

PART NAME, DESCRIPTION

* SUB DECK ASSEMBLY *

1	PRD30118A-01	SUB DECK SUB ASSY
2	PRD40087B	ERASE HEAD ARM SUB ASSY
3	PU54397	FULL ERASE HEAD
4	SSSP2005Z	SCREW, X2
5	PU51203A	ROLLER ASSY
6	REE1500	"E" RING
7	PU51204	THRUST CAP
8	PUM30001-13	SPRING
9	PU30080-69	SPRING
10	PU53826	GUIDE POLE
11	PU49276	NYLON NUT
12	PGZ00271	A/C HEAD ASSY
14	PRD40019A	HEAD BASE SUB ASSY
15	PRD40021	GUIDE PLATE
16	PRD40522A	POLE BASE ASSY(SUP.)
17	PRD40523A-01	POLE BASE ASSY(T.U.)
18	PU48806-3	RUBBER TIRE, X3
19	YFS3002.5FS	SCREW, X2
20	PU51638	PLATE, X2
21	PU51299	SPRING PLATE, X2
22	SPSP2606Z	SCREW, X2
23	PUM30005-12	COLLER
24	DPSP3006Z	SCREW
25	PUM30001-19	SPRING
26	SPSP2610Z	SCREW
27	SPSP2608Z	SCREW, X2
28	PU30080-49	SPRING, X2
29	DPSP3006Z	SCREW, X3
30	PRD40027B	G.ROLLER ASSY(T.U.)
31	YFS3002.5FS	SCREW
32	PRD40030	CAP
34	PU48748D	G.ROLLER ASSY, X2
37	PGD30004-5	SRPING
38	PU51294	GUIDE FRANGE, X2
39	Q03093-819	WASHER
40	Q03093-817	SPACER

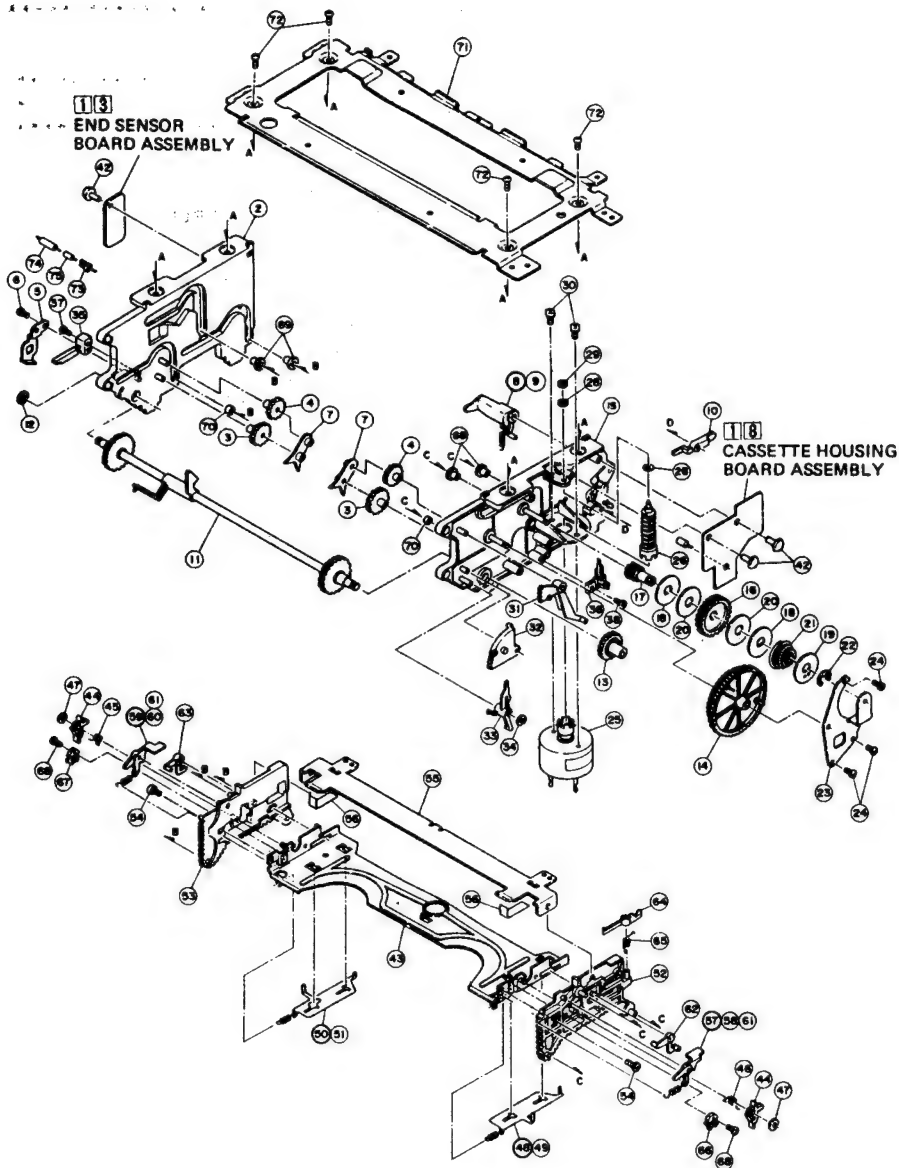
5.2.9 Drum assembly



#	REF NO.	PART NO.	PART NAME, DESCRIPTION

* DRUM ASSEMBLY *

1	PDV2154A	DRUM ASSY
2	PDM3193	BOARD (UPPER DRUM)
3	PDM2104B	UPPER DRUM ASSY
4	PDM4001A	DRUM SCREW ASSY, X2
5	PDM2105B-2	LOWER DRUM MOTOR ASSY
6	PDM4167A	C.P.W.B ASS'Y
7	LPSP2606Z	SCREW , X2
8	PDM4162A	BRUSH ASSY
9	DPSP3006Z	SCREW, X2
10	PDM4067	PART NO. LABEL



#	REF NO.	PART NO.	PART NAME, DESCRIPTION

***** CASSETTE HOUSING ASSEMBLY *****			
2	PRD30125A	G.STAY(L) ASS'Y	
3	PQ40059	GEAR-1, X2	
4	PRD40270	GEAR-2, X2	
5	PRD40532	SW COVER	
6	SBSE2608Z	SCREW	
7	PQ40061	DOUBLE CAP, X2	
8	PQ40102A-1	DOOR GUIDE ASSY	
9	PUM30001-111	SPRING	
10	PQ40063	GUIDE LEVER	
11	PRD40119A-1	CONNECT GEAR ASSY	
12	PUM30017-11	SLIT WASHER	
13	PRD40118	CAM GEAR(2)	
14	PRD30124	MAIN GEAR	
15	PRD30126A-02	G.STAY(R) ASS'Y	
16	PRD40527	WORM WHEEL	
17	PRD40529A	CLUTCH GEAR ASSY	
18	PRD40534	CLUTCH DISK, X2	
19	PRD40535	SPRI.HOLD PLATE	
20	PRD40537	PAD, X2	
21	PRD40538-01-03	COMPRESSION SPRING	
22	REE6000	E WASHER	
23	PRD40533	GEAR BRACKET	
24	SBSE2608Z	SCREW, X3	
25	PQ40090A	MOTOR ASSY	
26	PRD40291	WORM ASSY	
28	Q03093-838	WASHER, X2	
29	PUM30017	SLIT WASHER	
30	SPSP2604Z	SCREW, X2	
31	PQ40074	U.DOOR OPENER	
32	PQ40075-1-5	L.DOOR OPENER	
33	PQ40076-2	HOLD LEVER	
34	REE2500	E.RING	
35	PU51259-3	LEAF SWITCH	
36	PU55377-2	END SW	
37	SPSP2010Z	SCREW	
38	SBSE2608Z	SCREW	
42	PU48973-3	STOPPER, X3	
43	PRD30123A	CASSETTE HOLDER ASSY	
44	PRD30122-01-01	SW LEVER, X2	
45	PRD40539	TORSION SPRING(L)	
46	PRD40540	TORSION SPRING(R)	

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
47		PUM30017	SLIT WASHER, X2
48		PQ40106B-1	S.PLATE(R) ASSY
49		PUM30001-210	SPRING
50		PQ40107B-2	S.PLATE(L) ASSY
51		PUM30001-210	SPRING
52		PRD10052	BRACKET(R)
53		PRD10052-02	BRACKET(L)
54		SPSP2003Z	SCREW, X2
55		PQ30032-1-3	REINFORCEMENT
56		PGD40204	TEPHRON SHEET, X2
57		PQ40108B-3	LOCK LEVER(R) ASSY
58		PUM30001-110	SPRING
59		PQ40109B-3	LOCK LEVER(L) ASSY
60		PUM30001-110	SPRING
61		PQM30019-10	PAD, X2
62		PQ40081A	SW.LEVER(R) ASSY
63		PQ40081B	SW.LEVER(L) ASSY
64		PQ40083-1-5	LID OPENER
65		PQ40084-1-2	TORSION SPRING
66		PGZ00503	INSERT SW(R)
67		PGZ00502	INSERT SW(L)
68		SPSK1705M	SCREW, X2
69		PQ40086	ROLLER, X4
70		PQ40087-2	MINI ROLLER, X2
71		PRD20034	ROOF PLATE
72		SBSE2608Z	SCREW, X4
73		PQ40299	WIRE CLAMP
74		QXT329H-035	TUBE
75		PRD40101	WIRE GUARD

SECTION 6 ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the Δ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS—All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS—All capacitance values are in μ F, unless otherwise indicated.

pF	: μ F (Pico farad)
C Cap	: Ceramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

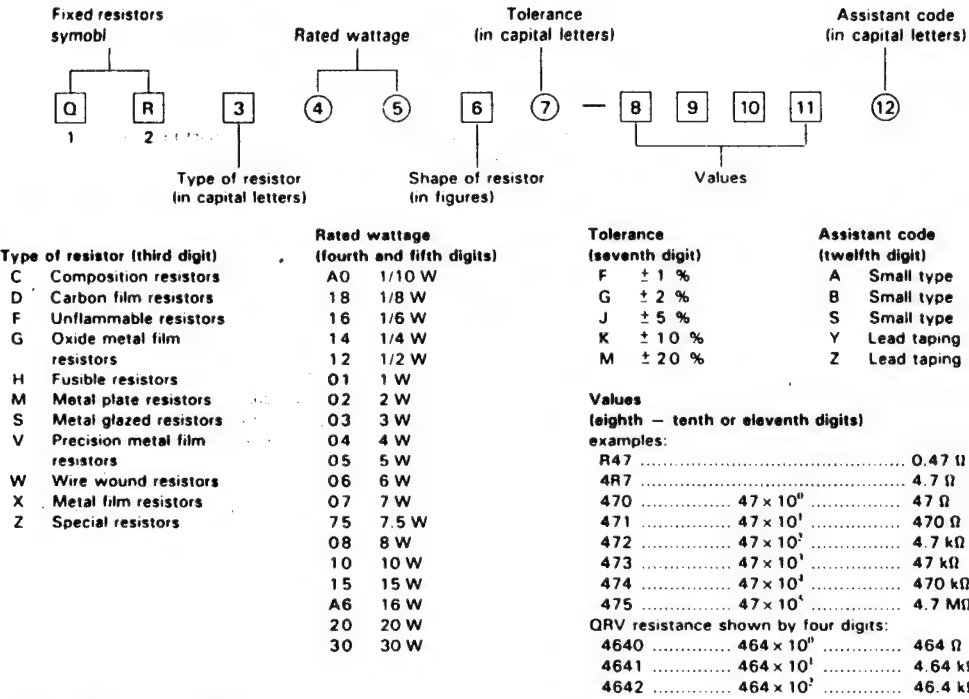
NOTES:

- [2 digits] indicates circuit board symbol number.
- "X" indicates quantity per set.

6.1 STANDARD PART NUMBER CODING

6.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.



Type of resistor (third digit)

C Composition resistors

D Carbon film resistors

F Unflammable resistors

G Oxide metal film resistors

H Fusible resistors

M Metal plate resistors

S Metal glazed resistors

V Precision metal film resistors

W Wire wound resistors

X Metal film resistors

Z Special resistors

Rated wattage (fourth and fifth digits)

A0 1/10 W

18 1/8 W

16 1/6 W

14 1/4 W

12 1/2 W

01 1 W

02 2 W

03 3 W

04 4 W

05 5 W

06 6 W

07 7 W

75 7.5 W

08 8 W

10 10 W

15 15 W

A6 16 W

20 20 W

30 30 W

Tolerance (seventh digit)

F ± 1 %

G ± 2 %

J ± 5 %

K ± 10 %

M ± 20 %

Assistant code (twelfth digit)

A Small type

B Small type

S Small type

Y Lead tapping

Z Lead tapping

Values (eighth – tenth or eleventh digits)

examples:

R47 0.47 Ω

4R7 4.7 Ω

470 47 Ω

471 47 × 10¹ 470 Ω

472 47 × 10² 4.7 kΩ

473 47 × 10³ 47 kΩ

474 47 × 10⁴ 470 kΩ

475 47 × 10⁵ 4.7 MΩ

QRV resistance shown by four digits:

4640 464 × 10⁰ 464 Ω

4641 464 × 10¹ 4.64 kΩ

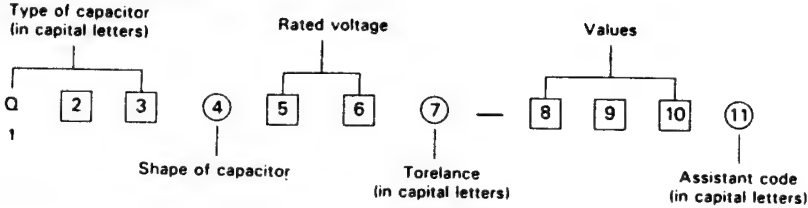
4642 464 × 10² 46.4 kΩ

Shape of resistor (sixth digit)
Note: ■ indicates flame retardant resistor.

Type of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type				Chip			
9			Lug (C) type							

6.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.



Ceramic capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation					8,A
QCV	Ceramic					
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
Q CZ	Special type					
QCB	Ceramic			8	C	

Electrolytic capacitors

Type of capacitor (first-third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum					
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,8	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,8	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Normal		Flame retardant	
			Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5, 7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3, 7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3, 8		
QFS	Polystyrol	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Sixth digit		A	B	C	D	E	F	G	H	J	K	V	W	X
Fifth digit														
0						3.15	4.0		6.3					
1	10		16	20	25		40	50	63	80	35			
2	100	125	160	200	250	315	400	500	630		350	450	600	
3	1000	1250		2000				5000						

Tolerance (seventh digit)

A	+100 %	M	±20 %
F	±1 %	N	±30 %
G	±2 %	P	+100 %
H	+50 %	R	+30 %
J	±5 %	X	+40 %
K	±10 %	Z	+80 %
			-20 %

Values (eighth – tenth digits)

Example: Values are in picofarads

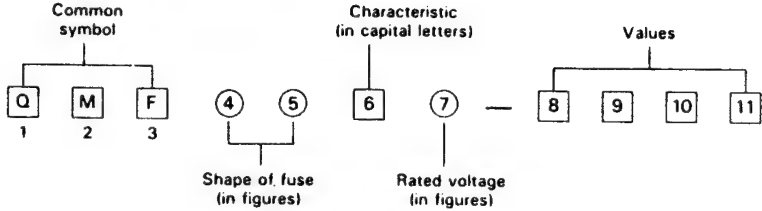
10110 × 10 ¹ pF100 pF
10210 × 10 ² pF1,000 pF (0.001 μF)
10310 × 10 ³ pF10,000 pF (0.01 μF)
10410 × 10 ⁴ pF100,000 pF (0.1 μF)
10510 × 10 ⁵ pF1 μF
5R05.0 pF

Assistant code (eleventh digit)

G	Small size
Z	Lead tapping
Y	Lead tapping

6.1.3 Fuse coding

Standard fuse part numbers are as follows.



Shape of fuse
(fourth and fifth digits)

51	ø5.2 × 20 mm
60	ø6.4 × 30 mm
61	ø6.35 × 31.8 mm
63	ø6.4 × 30 mm with lead wires
66	ø6.35 × 31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1 – 1 A : AC250 V
	1.25 – 6.3 A : AC125 V

Values
(eighth-tenth or eleventh digits)

example:

R630.63 A
1R01.0 A
2R52.5 A
10010 A
R3150.315 A
1R251.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

6-6

6-7

Q.A. REF NO.	PART NO.	PART NAME, DESCRIPTION
C60	QER41CM-336	E CAPACITOR
C61	QEU41CM-227	E CAPACITOR
C62	QEU41CM-227	E CAPACITOR
C63	QER41CM-226	E CAPACITOR
C64	QER41CM-226	E CAPACITOR
C65	QFP42AF-273M	PP CAPACITOR
OR	QFP41HF-273	PP CAPACITOR
C66	QFP42AF-273M	PP CAPACITOR
OR	QFP41HF-273	PP CAPACITOR
C67	QER41EM-475	E CAPACITOR
C68	QER41EM-475	E CAPACITOR
C69	QFP42AF-562M	PP CAPACITOR
OR	QFP31HF-562	PP CAPACITOR
C70	QFP42AF-562M	PP CAPACITOR
OR	QFP31HF-562	PP CAPACITOR
C71	QFN41HJ-122	M CAPACITOR
C72	QFN41HJ-122	M CAPACITOR
C73	QFP42AF-472M	P P CAPA
OR	QFP31HF-472	P P CAPA
C74	QFP42AF-472M	P P CAPA
OR	QFP31HF-472	P P CAPA
C75	QFN41HJ-122	M CAPACITOR
C76	QFN41HJ-122	M CAPACITOR
C77	QFN41HJ-682	M CAPACITOR
C78	QFN41HJ-682	M CAPACITOR
C79	QER41CM-476	E CAPACITOR
C80	QER41CM-476	E CAPACITOR
C81	QFN41HJ-473	M CAPACITOR
C82	QFN41HJ-473	M CAPACITOR
C85	QFV41HJ-684	TF CAPACITOR
C86	QFV41HJ-684	TF CAPACITOR
C87	QEB41HM-104	E CAPACITOR
C88	QEB41HM-104	E CAPACITOR
C89	QEB41HM-334	E CAPACITOR
C90	QEB41HM-334	E CAPACITOR
C91	QER41CM-104	E CAPACITOR
C92	QER41CM-104	E CAPACITOR
C93	QER41CM-476	E CAPACITOR
C94	QER41CM-476	E CAPACITOR
C95	QFN41HJ-182	M CAPACITOR
C96	QFN41HJ-182	M CAPACITOR
C97	QEU41CM-337	E CAPACITOR
C98	QEU41CM-107	E CAPACITOR
C99	QEU41CM-107	E CAPACITOR
C100	QCS11HJ-101	CAPACITOR
C101	QCS11HJ-101	CAPACITOR
C102	QER41EM-475	E CAPACITOR
C103	QER41CM-226	E CAPACITOR
C104	QER41CM-226	E CAPACITOR
C105	QER41HM-225	E CAPACITOR
C106	QER41CM-104	E CAPACITOR
C107	QER41EM-475	E CAPACITOR
C108	QER41EM-475	E CAPACITOR
C113	QFV41HJ-153M	TF CAPACITOR
C114	QFV41HJ-153M	TF CAPACITOR
C115	QER41EM-475	E CAPACITOR
C116	QER41EM-475	E CAPACITOR
C117	QCS11HJ-391	CAPACITOR
C118	QCS11HJ-391	CAPACITOR
C119	QFN41HJ-123	M CAPACITOR
C120	QFN41HJ-123	M CAPACITOR
C401	QER41EM-475	E CAPACITOR
C402	QER41EM-475	E CAPACITOR
C403	QFN41HJ-472	M CAPACITOR
C404	QFN41HJ-472	M CAPACITOR
C405	QFN41HJ-472	M CAPACITOR
C406	QFN41HJ-472	M CAPACITOR

Q.A. REF NO.	PART NO.	PART NAME, DESCRIPTION
L1	PG200121-472	PEAKING COIL
L2	PG200121-472	PEAKING COIL
L3	PU30204-51R	CHOKE COIL
L7	PU48530-391J	PEAKING COIL
L8	PU48530-391J	PEAKING COIL
LPF1	PUS1764	LOW PASS FILTER
LPF2	PUS1764	LOW PASS FILTER
SCW1	GBST3006Z	TH.TAP.SCREW, X4
SLD1	PU33643	SHIELD CASE
SLD2	PGD40329-02	INSULATOR
TP1	PUS6008	TEST-PIN(TP1-27)
CN1	PU43351-2Y	CAP HOUSING
CN2	PU43351-2	CAP HOUSING
CN3	PU43351-3	CAP HOUSING(CN3,6,7)
CN4	PU43351-2R	CAP HOUSING
CN5	PU43351-4	CAP HOUSING(CN5,9)
CN8	PU43351-4Y	CAP HOUSING
CN10	PU43351-3Y	CAP HOUSING
CN11	PU43351-4R	CAP HOUSING
CN12	PU43351-4R	CAP HOUSING
CN41	PU43351-3Y	CAP HOUSING
CN42	PU43351-3R	CAP HOUSING
CN44	PU43351-2	CAP HOUSING
CN101	PGZ00644	OSC BLOCK
CN102	PUS3811	MDCK(B), X2
CN103	PU32908	SERVO PWB STAY
CP1	ICP-F10	CIRCUIT PROTECTOR
CP2	ICP-F10	CIRCUIT PROTECTOR

***** 0.2.2 FM AUDIO CIRCUIT ASSEMBLY <02> *****		

PW8A	PGE100948-04	FM AUD.PWB ASSY
IC1	HA11752	IC
IC2	AN6299NK	IC
IC3	AN3930K	IC
IC4	H801951A	IC
IC5	BA634	IC
IC6	BA236	IC
IC7	TC4030BP	IC
IC8	M5218P	IC
IC9	M5218P	IC
IC10	M5218P	IC
IC11	NJM78L050	IC
IC41	M5218P	IC
IC42	M5218P	IC
Q1	2SC2021R,S	TRANSISTOR
Q2	2SC2021R,S	TRANSISTOR
Q3	2SC2647C	TRANSISTOR
Q4	2SC2647C	TRANSISTOR
Q5	2SC2021R,S	TRANSISTOR
Q6	2SC2647C	TRANSISTOR
Q7	2SC2647C	TRANSISTOR
Q8	2SB6430,R,S	TRANSISTOR
Q9	2SD638Q,R,S	TRANSISTOR

Q.A. REF NO.	PART NO.	PART NAME, DESCRIPTION
Q10	2SC2647C	TRANSISTOR
Q11	2SC2647C	TRANSISTOR
Q12	2SC2647C	TRANSISTOR
Q15	2SD973R	TRANSISTOR
Q16	2SD973R	TRANSISTOR
Q17	2SD973R	TRANSISTOR
Q18	2SD973R	TRANSISTOR
Q19	DTA114YF	TRANSISTOR
Q20	DTA114YF	TRANSISTOR
Q21	DTA114EF	TRANSISTOR
Q22	DTA124EF	TRANSISTOR
Q23	DTC124EF	TRANSISTOR
Q24	2SB642R,S	TRANSISTOR
Q25	2SB793R	TRANSISTOR
Q26	2SD638R,S	TRANSISTOR
Q27	DTA114EF	TRANSISTOR
Q28	2SD973AR	TRANSISTOR
Q29	DTA124EF	TRANSISTOR
Q30	DTC124EF	TRANSISTOR
Q31	DTC124EF	TRANSISTOR
Q32	2SB643R,S	TRANSISTOR
Q33	2SC2878A,B	TRANSISTOR
D1	0A90	DIODE
D2	0A90	DIODE
D3	0A90	DIODE
D4	0A90	DIODE
D5	RD2.0EB	ZENER DIODE
D6	RD2.0EB	ZENER DIODE
D7	1SS133	DIODE
OR	MA165	DIODE
D8	1SS133	DIODE
OR	MA165	DIODE
D9	1SS133	DIODE
OR	MA165	DIODE
D10	1SS133	DIODE
OR	MA165	DIODE
D11	1SS133	DIODE
OR	MA165	DIODE
D12	1SS133	DIODE
OR	MA165	DIODE
D13	1SS133	DIODE
OR	MA165	DIODE
D14	1SS133	DIODE
OR	MA165	DIODE
D15	1SS133	DIODE
OR	MA165	DIODE
D16	1SS133	DIODE
D17	RD5.1EB2	ZENER DIODE
D18	RD5.4EB2	ZENER DIODE
D19	1SS133	DIODE
OR	MA165	DIODE
D20	1SS133	DIODE
OR	MA165	DIODE
D21	1SS133	DIODE
OR	MA165	DIODE
D22	1SS133	DIODE
OR	MA165	DIODE
D23	RD6.8EB	ZENER DIODE
R1	QRD161J-271	RESISTOR
R2	QRD161J-102	RESISTOR
R3	QRD161J-392	RESISTOR
R4	QRD161J-392	RESISTOR
R5	QRD161J-100	RESISTOR
R6	QRD161J-100	RESISTOR
R7	QRD161J-152	RESISTOR
R8	QRD161J-152	RESISTOR

Q.A. REF NO.	PART NO.	PART NAME, DESCRIPTION
R9	QRD161J-123	RESISTOR
R10	QRD161J-123	RESISTOR
R11	QRD161J-681	RESISTOR
R12	QRD161J-102	RESISTOR
R13	QRD161J-473	RESISTOR
R14	QRD161J-272	RESISTOR
R15	QRD161J-153	RESISTOR
R16	QRD161J-471	RESISTOR
R17	QRD161J-224	RESISTOR
R18	QRD161J-103	RESISTOR
R19	QRD161J-681	RESISTOR
R20	QRD161J-473	RESISTOR
R21	QRD161J-152	RESISTOR
R22	QRD161J-223	RESISTOR
R23	QRD161J-561	RESISTOR
R24	QRD161J-821	RESISTOR
R25	QRD161J-102	RESISTOR
R26	QRD161J-102	RESISTOR
R27	QRD161J-102	RESISTOR
R28	QRD161J-102	RESISTOR
R29	QRD161J-102	RESISTOR
R30	QRD161J-102	RESISTOR
R31	QRD161J-102	RESISTOR
R32	QRD161J-100	RESISTOR
R33	QRD161J-152	RESISTOR
R34	QRD161J-332	RESISTOR
R35	QRD161J-332	RESISTOR
R36	QRD161J-472	RESISTOR
R37	QRD161J-100	RESISTOR
R38	QRD161J-152	RESISTOR
R39	QRD161J-104	RESISTOR
R40	QRD161J-104	RESISTOR
R41	QRD161J-102	RESISTOR
R42	QRD161J-104	RESISTOR
R43	QRD161J-682	RESISTOR
R44	QRD161J-682	RESISTOR
R45	QRD161J-222	RESISTOR
R46	QRD161J-222	RESISTOR
R47	QRD161J-562	RESISTOR
R48	QRD161J-562	RESISTOR
R49	QRD161J-153	RESISTOR
R50	QRD161J-153	RESISTOR
R51	QRD161J-473	RESISTOR
R52	QRD161J-473	RESISTOR
R53	QRD161J-153	RESISTOR
R54	QRD161J-153	RESISTOR
R55	QRD161J-102	RESISTOR
R56	QRD161J-102	RESISTOR
R57	QRD161J-102	RESISTOR
R58	QRD161J-102	RESISTOR
R59	QRD161J-152	RESISTOR
R60	QRD161J-152	RESISTOR
R61	QRD161J-182	RESISTOR
R62	QRD161J-182	RESISTOR
R63	QRD161J-392	RESISTOR
R64	QRD161J-392	RESISTOR
R65	QRD161J-682	RESISTOR
R66	QRD161J-682	RESISTOR
R67	QRD161J-821	RESISTOR
R68	QRD161J-821	RESISTOR
R69	QRD161J-123	RESISTOR
R70	QRD161J-123	RESISTOR
R71	QRD161J-392	RESISTOR
R72	QRD161J-392	RESISTOR
R73	QRD161J-123	RESISTOR
R74	QRD161J-123	RESISTOR
R75	QRD161J-513	RESISTOR

REF NO.	PART NO.	PART NAME, DESCRIPTION
R76	QRD161J-513	RESISTOR
R77	QRD161J-153	RESISTOR
R78	QRD161J-153	RESISTOR
R79	QRD161J-562	RESISTOR
R80	QRD161J-562	RESISTOR
R81	QVZ3513-332	V RESISTOR
R82	QVZ3513-332	V RESISTOR
R83	QRD161J-224	RESISTOR
R84	QRD161J-224	RESISTOR
R85	QVZ3513-332	V RESISTOR
R86	QVZ3513-332	V RESISTOR
R87	QRD161J-123	RESISTOR
R88	QRD161J-822	RESISTOR
R89	QRD161J-182	RESISTOR
R90	QRD161J-182	RESISTOR
R91	QRD161J-472	RESISTOR
R92	QRD161J-472	RESISTOR
R93	QRD161J-222	RESISTOR
R94	QRD161J-222	RESISTOR
R95	QVZ3513-103	V RESISTOR
R96	QVZ3513-103	V RESISTOR
R97	QRD161J-222	RESISTOR
R98	QRD161J-222	RESISTOR
R99	QRD161J-334	RESISTOR
R100	QRD161J-583	RESISTOR
R101	QRD161J-563	RESISTOR
R102	QRD161J-124	RESISTOR
R103	QRD161J-221	RESISTOR
R104	QRD161J-221	RESISTOR
R105	QVZ3513-472	V RESISTOR
R106	QVZ3513-472	V RESISTOR
R107	QRD161J-104	RESISTOR
R108	QRD161J-104	RESISTOR
R109	QRD161J-104	RESISTOR
R110	QRD161J-104	RESISTOR
R111	QRD161J-102	RESISTOR
R112	QRD161J-102	RESISTOR
R113	QRD161J-392	RESISTOR
R114	QRD161J-392	RESISTOR
R115	QRD161J-102	RESISTOR
R116	QRD161J-102	RESISTOR
R117	QRD161J-273	RESISTOR
R118	QRD161J-273	RESISTOR
R119	QRD161J-273	RESISTOR
R120	QRD161J-273	RESISTOR
R121	QRD161J-123	RESISTOR
R122	QRD161J-123	RESISTOR
R123	QRD161J-473	RESISTOR
R124	QRD161J-473	RESISTOR
R125	QRD161J-103	RESISTOR
R126	QRD161J-103	RESISTOR
R127	QRD161J-102	RESISTOR
R128	QRD161J-102	RESISTOR
R129	QRD161J-122	RESISTOR
R130	QRD161J-122	RESISTOR
R131	QRD161J-124	RESISTOR
R132	QRD161J-124	RESISTOR
R133	QRD161J-124	RESISTOR
R134	QRD161J-124	RESISTOR
R135	QRD161J-333	RESISTOR
R136	QRD161J-333	RESISTOR
R137	QRD161J-333	RESISTOR
R138	QRD161J-333	RESISTOR
R139	QRD161J-561	RESISTOR
R140	QRD161J-561	RESISTOR
R141	QVZ3513-682	V RESISTOR
R142	QVZ3513-682	V RESISTOR

REF NO.	PART NO.	PART NAME, DESCRIPTION
R143	QRD161J-102	RESISTOR
R144	QRD161J-102	RESISTOR
R145	QRD161J-104	RESISTOR
R146	QRD161J-104	RESISTOR
R147	QRD161J-681	RESISTOR
R148	QRD161J-562	RESISTOR
R149	QRD161J-182	RESISTOR
R150	QRD161J-182	RESISTOR
R151	QVZ3513-154	V RESISTOR
R152	QVZ3513-154	V RESISTOR
R153	QRD161J-274	RESISTOR
R154	QRD161J-274	RESISTOR
R155	QRD161J-183	RESISTOR
R156	QRD161J-183	RESISTOR
R157	QRD161J-561	RESISTOR
R158	QRD161J-102	RESISTOR
R160	QRD161J-100	RESISTOR
R161	QRD161J-682	RESISTOR
R162	QRD161J-682	RESISTOR
R163	QRD161J-102	RESISTOR
R164	QRD161J-562	RESISTOR
R165	QRD161J-103	RESISTOR
R166	QRD161J-472	RESISTOR
R167	QRD161J-563	RESISTOR
R168	QRD161J-333	RESISTOR
R169	QRD161J-271	RESISTOR
R170	QRD161J-102	RESISTOR
R171	QRD161J-472	RESISTOR
R172	QRD161J-223	RESISTOR
R173	QRD161J-102	RESISTOR
R174	QRD161J-271	RESISTOR
R175	QRD161J-103	RESISTOR
R176	QRD161J-103	RESISTOR
R177	QRD161J-103	RESISTOR
R178	QRD161J-332	RESISTOR
R179	QRD161J-332	RESISTOR
R180	QRD161J-223	RESISTOR
R181	QRD161J-223	RESISTOR
R182	QRD161J-103	RESISTOR
R183	QRD161J-103	RESISTOR
R184	QRD161J-103	RESISTOR
R185	QRD161J-333	RESISTOR
R186	QRD161J-333	RESISTOR
R187	QRD161J-562	RESISTOR
R188	QRD161J-472	RESISTOR
R189	QRD161J-154	RESISTOR
R190	QRD161J-102	RESISTOR
R191	QRD161J-153	RESISTOR
R192	QRD161J-153	RESISTOR
R193	QRD161J-223	RESISTOR
R194	QRD161J-223	RESISTOR
R195	QRD161J-182	RESISTOR
R196	QRD161J-182	RESISTOR
R401	QRD161J-273	RESISTOR
R402	QRD161J-273	RESISTOR
R403	QRD161J-273	RESISTOR
R404	QRD161J-273	RESISTOR
R405	QRD161J-273	RESISTOR
R406	QRD161J-273	RESISTOR
R407	QRD161J-273	RESISTOR
R408	QRD161J-273	RESISTOR
R409	QRD161J-822	RESISTOR
R410	QRD161J-822	RESISTOR
R411	QRD161J-822	RESISTOR
R412	QRD161J-822	RESISTOR
R413	QRD161J-822	RESISTOR
R414	QRD161J-822	RESISTOR

REF NO.	PART NO.	PART NAME, DESCRIPTION
R415	QRD161J-822	RESISTOR
R416	QRD161J-822	RESISTOR
R417	QRD161J-822	RESISTOR
R418	QRD161J-822	RESISTOR
C1	QET61AM-476	E CAPACITOR
C2	QCF31HP-103	CAPACITOR
C3	QCF31HP-473	CAPACITOR
C4	QCF31HP-103	CAPACITOR
C5	QCF31HP-103	CAPACITOR
C6	QCF31HP-103	CAPACITOR
C7	QCS31HJ-221	CAPACITOR
C8	QCS31HJ-221	CAPACITOR
C9	QCF31HP-223	CAPACITOR
C10	QCF31HP-223	CAPACITOR
C11	QET61HM-105	E CAPACITOR
C12	QET61HM-105	E CAPACITOR
C13	QCS31HJ-331	CAPACITOR
C14	QCS31HJ-390	CAPACITOR
C15	QCF31HP-103	CAPACITOR
C16	QCF31HP-103	CAPACITOR
C17	QET61HM-224	E CAPACITOR
C18	QCF31HP-103	CAPACITOR
C19	QET61AM-476	E CAPACITOR
C20	QCF31HP-103	CAPACITOR
C21	QCF31HP-103	CAPACITOR
C22	QER40JM-476	E CAPACITOR
C23	QCF31HP-223	CAPACITOR
C24	QCF31HP-103	CAPACITOR
C25	QCF31HP-103	CAPACITOR
C26	QFN31HK-392	M CAPACITOR
C27	QCF31HP-222	CAPACITOR
C28	QCF31HP-103	CAPACITOR
C29	QCF31HP-103	CAPACITOR
C30	QCF31HP-103	CAPACITOR
C31	QET61HM-225	E CAPACITOR
C32	QET61HM-225	E CAPACITOR
C33	QER61HM-225	E CAPACITOR
C34	QET61HM-225	E CAPACITOR
C35	QET61CM-106	E CAPACITOR
C36	QET61CM-106	E CAPACITOR
C37	QER61CM-226	E CAPACITOR
C38	QER61CM-226	E CAPACITOR
C39	QET61CM-106	E CAPACITOR
C40	QET61CM-106	E CAPACITOR
C41	QET61CM-106	E CAPACITOR
C42	QET61CM-106	E CAPACITOR
C43	QFN31HK-122	M CAPACITOR
C44	QFN31HK-122	M CAPACITOR
C45	QFN31HK-103	M CAPACITOR
C46	QFN31HK-103	M CAPACITOR
C47	QCS31HJ-151	CAPACITOR
C48	QCS31HJ-151	CAPACITOR
C49	QET61AM-336	E CAPACITOR
C50	QET61AM-336	E CAPACITOR
C51	QET61AM-336	E CAPACITOR
C52	QET61AM-336	E CAPACITOR
C53	QFN31HK-333	M CAPACITOR
C54	QFN31HK-333	M CAPACITOR
C55	QET61HM-225	E CAPACITOR
C56	QET61HM-225	E CAPACITOR
C57	QFN31HK-153	M CAPACITOR
C58	QFN31HK-153	M CAPACITOR
C59	QET61AM-336	E CAPACITOR
C60	QET61AM-336	E CAPACITOR
C61	QET61AM-336	E CAPACITOR
C62	QET61AM-336	E CAPACITOR
C63	QET61CM-476	E CAPACITOR

REF NO.	PART NO.	PART NAME, DESCRIPTION
C64	QET61CM-107	E CAPACITOR
C65	QFN31HK-103	M CAPACITOR
C66	QFN31HK-103	M CAPACITOR
C67	QER61AM-336	E CAPACITOR
C68	QET61AM-336	E CAPACITOR
C69	QCT05CH-101	CAPACITOR
C70	QCT05CH-101	CAPACITOR
C71	QET61AM-336	E CAPACITOR
C72	QET61AM-336	E CAPACITOR
C73	QFN31HJ-182	M CAPACITOR
C74	QFN31HJ-182	M CAPACITOR
C75	QER61CM-476	E CAPACITOR
C76	QET61AM-107	E CAPACITOR
C77	QET61AM-336	E CAPACITOR
C78	QET61AM-336	E CAPACITOR
C79	QFN31HK-392	M CAPACITOR
C80	QFN31HJ-392	M CAPACITOR
C81	QET61EM-335	E CAPACITOR
C82	QER61CM-476	E CAPACITOR
C83	QCS31HJ-121	CAPACITOR
C84	QET61CM-106	E CAPACITOR
C85	QFN31HK-563	M CAPACITOR
C86	QCF31HP-103	CAPACITOR
C87	QCF31HP-103	CAPACITOR
C88	QCF31HP-103	CAPACITOR
C89	QCF31HP-103	CAPACITOR
C90	QET61CM-476	E CAPACITOR
C91	QET61CM-226	E CAPACITOR
C92	QET61CM-226	E CAPACITOR
C93	QET61CM-226	E CAPACITOR
C94	QET61CM-226	E CAPACITOR
C95	QER61CM-476	E CAPACITOR
C96	QER61CM-476	E CAPACITOR
C97	QEP61EM-475	NP E CAPACITOR
C98	QEP61EM-475	NP E CAPACITOR
C99	QER61AM-226	E CAPACITOR
C100	QER61AM-226	E CAPACITOR
C101	QEP61EM-475	NP E CAPACITOR
C102	QEP61EM-475	NP E CAPACITOR
C103	QER61AM-226	E CAPACITOR
C104	QER61AM-226	E CAPACITOR
C105	QER61EM-475	E CAPACITOR
C106	QER61EM-475	E CAPACITOR
C107	QFN31HK-332	M CAPACITOR
C108	QFN31HK-332	M CAPACITOR
C109	QFN31HK-102	M CAPACITOR
C110	QFN31HK-102	M CAPACITOR
C111	QFN31HK-273	M CAPACITOR
C112	QFN31HK-273	M CAPACITOR
C113	QET61CM-226	E CAPACITOR
C114	QET61CM-106	E CAPACITOR
C115	QET61EM-335	E CAPACITOR
C116	QER61CM-476	E CAPACITOR
C117	QET61CM-227	E CAPACITOR
C118	QET61CM-227	E CAPACITOR
C119	QET61CM-106	E CAPACITOR
C122	QER61CM-476	E CAPACITOR
C123	QER61CM-476	E CAPACITOR
C124	QCS31HJ-680	CAPACITOR
C125	QCS31HJ-680	CAPACITOR
C126	QCF31HP-102	CAPACITOR
C127	QCF31HP-102	CAPACITOR
C128	QER61EM-475	E CAPACITOR
C129	QER61EM-475	E CAPACITOR
C130	QER61CM-106	E CAPACITOR
C131	QER61CM-476	E CAPACITOR
C132	QET61CM-476	E CAPACITOR

REF NO.	PART NO.	PART NAME, DESCRIPTION
C133	QCF31HP-103	CAPACITOR
C401	QEP41EM-475	NP E CAPACITOR
C402	QEP41EM-475	NP E CAPACITOR
C403	QEP41EM-475	NP E CAPACITOR
C404	QEP41EM-475	NP E CAPACITOR
C405	QER61CM-476	E CAPACITOR
C406	QER61CM-476	E CAPACITOR
C407	QER61CM-476	E CAPACITOR
C408	QER61CM-476	E CAPACITOR
C409	QER61CM-476	E CAPACITOR
C410	QER61CM-476	E CAPACITOR
C411	QCS31MJ-780	CAPACITOR
C412	QCS31MJ-780	CAPACITOR
C413	QCS31MJ-680	CAPACITOR
C414	QCS31MJ-680	CAPACITOR
C415	QER61CM-476	E CAPACITOR
C416	QER61CM-476	E CAPACITOR
L1	PUS3223-101J	PEAKING COIL
L2	PUS3223-101J	PEAKING COIL
L3	PUS3223-101J	PEAKING COIL
L4	PUS3223-221J	PEAKING COIL
L5	PUS3223-271J	PEAKING COIL
L7	PUS8308-152J	COIL
L8	PUS8308-152J	COIL
L9	PUS8308-222J	COIL
L10	PUS8308-222J	COIL
L11	PUS3223-271J	PEAKING COIL
BPF1	PUS6177-3	BAND PASS FILTER
BPF2	PUS6177-4	BAND PASS FILTER
BPF3	PUS6177-3	BAND PASS FILTER
TH1	ERT-02FHL202S	THERMISTOR
TH2	ERT-02FHL202S	THERMISTOR
TH3	ERT-02FHL202S	THERMISTOR
TH4	ERT-02FHL202S	THERMISTOR
TH5	ERT-02FHL103S	THERMISTOR
TH6	ERT-02FHL103S	THERMISTOR
T1	PUS6175	S.TRANS(T1,2)
CL1	PUS4969-2	WIRE CLAMP, X4
S1D2	PGD40158	SHIELD CASE(2)
S1D3	PGD40139	SHIELD CASE(3)
TP1	PUS4983	TEST PIN(TP1-26)
CH1	PU43351-4	CAP HOUSING
CH2	PU43351-3	CAP HOUSING
CH5	PU43351-2	CAP HOUSING
CH6	PU43351-2	CAP HOUSING
CH7	PU43351-3	CAP HOUSING
CH8	PU43351-3	CAP HOUSING
CH9	PU43351-2Y	CAP HOUSING
CH10	PU43351-2R	CAP HOUSING
CH11	PU43351-4R	CAP HOUSING
CH12	PU43351-2	CAP HOUSING
CH13	PU43351-3Y	CAP HOUSING
CH14	PU43351-2R	CAP HOUSING
CH15	PU43351-4R	CAP HOUSING
CH16	PU43351-4	CAP HOUSING
CH17	PU43351-2	CAP HOUSING
CH41	PU43351-3Y	CAP HOUSING
CH42	PU43351-3R	CAP HOUSING
CH101	PUS2104	TAPPING SUPPORT, X2

REF NO.	PART NO.	PART NAME, DESCRIPTION
CP1	ICP-F10	CIRCUIT PROTECTOR
CP2	ICP-F10	CIRCUIT PROTECTOR

***** 8.2.3 REAR-1 CIRCUIT BOARD ASSEMBLY <03> *****		
PWBA	PGE30012A-1	REAR-1 PWB ASSY
Q1	DTC144EF	TRANSISTOR
R1	QRD167J-750	RESISTOR

***** 8.2.4 REAR-2 CIRCUIT BOARD ASSEMBLY <04> *****		
PWBA	PGE30150A	REAR-2 PWB ASSY
R1	QRD167J-472	RESISTOR
R2	QRD167J-822	RESISTOR
R3	QRD167J-103	RESISTOR

***** 8.2.5 VR & SWITCH CIRCUIT BOARD <05> *****		
PWBA	PGE20044	VR BOARD PWB
Q1	DTC124EF	TRANSISTOR
R1	QRD167J-391	RESISTOR
R2	QRD121J-151	RESISTOR
R3	QRD121J-151	RESISTOR
R4	QRD121J-151	RESISTOR

***** 8.2.6 FULL ERASE HEAD CIRCUIT BOARD <06> *****		
PWBA	PUS3259-1-2	F.E.HEAD PWB
IC1	HMC-230	IC
C1	QFP42AG-363	P CAP

***** 8.2.7 REGULATOR CIRCUIT BOARD ASSEMBLY <07> *****		
PWBA	PGE20030B-4	REG.PWB ASS'Y
IC1	STR2012A	IC
IC2	STR2012A	IC

REF NO.	PART NO.	PART NAME, DESCRIPTION
IC3	STR2012A	IC
Q1	2SD0985	TRANSISTOR
O1	RD6.8E83	ZENER DIODE
O3	TF320M	THYRISTOR
DA1	RB601F	DIODE
DA2	RB601F	DIODE
R1	QR0127J-271	RESISTOR
R2	QVZ3504-331	V RESISTOR
R3	QR0167J-272	RESISTOR
R4	QRD167J-102	RESISTOR
R6	QRD167J-222	RESISTOR
C1	QFH52AM-224	MM CAPACITOR
C2	QEL71HR-478	E CAPACITOR
C3	QET41HM-107	E CAPACITOR
C4	QET41EM-108	E CAPACITOR
C5	QET41HM-107	E CAPACITOR
C6	QET41EM-108	E CAPACITOR
C7	QET41HM-107	E CAPACITOR
C8	QET41EM-108	E CAPACITOR
C9	QFH52AM-224	MM CAPACITOR
C10	QEL71VR-688	E CAPACITOR
C11	QCF11HP-223	CAPACITOR
C12	QET41CM-227	E CAPACITOR
C13	QET41CM-227	E CAPACITOR
C14	QCF11HP-223	CAPACITOR
C15	QET41CM-227	E CAPACITOR
C16	QCF11HP-223	CAPACITOR
C17	QET41EM-108	E CAPACITOR
C18	QET41EM-224	E CAPACITOR
C19	QET41EM-106	E CAPACITOR
C20	QFN41HK-104	M CAPACITOR
L1	PGZ00139-331	CHOKO COIL
L2	PGZ00139-331	CHOKO COIL
L3	PGZ00139-331	CHOKO COIL
L4	PGZ00139-331	CHOKO COIL
L5	PGZ00139-331	CHOKO COIL
L6	PGZ00139-331	CHOKO COIL
HS1	PGD40116	HEAT SINK
SCW1	G8ST3008Z	TH.TAP.SCREW
SCW2	SPSP3010Z	SCREW
SPC1	PGZ00151	TR SPACER
TP1	PUS6008	TEST-PIN(TP1-8)
CH1	PUS0597-3	CAP HOUSING
CH2	PUS0597-3	CAP HOUSING
CH4	PU43351-6	CAP HOUSING
CH5	PU43351-4Y	CAP HOUSING
CH6	PU43351-4R	CAP HOUSING
CH7	PU43351-2R	CAP HOUSING
CH8	PU43351-9	CAP HOUSING
CH9	PU43351-7	CAP HOUSING
CH10	PU43351-2	CAP HOUSING
CH11	PU43351-2	CAP HOUSING
CH12	PU43351-2	CAP HOUSING
CH13	PU43351-2Y	CAP HOUSING
CH14	PU43351-2	CAP HOUSING
CH15	PU43351-2R	CAP HOUSING
CP5	PUS1212	FUSE CLIP

REF NO.	PART NO.	PART NAME, DESCRIPTION
***** 8.2.8 SYSTEM CONTROL CIRCUIT ASSEMBLY <08> *****		
PWBA	PGE10012A-04	SYSCON PWB ASSY
IC1	HD14021B	IC
	OR TC4021BP	IC
	OR UPD4021BC	IC
IC2	HD14021B	IC
	OR UPD4021BC	IC
	OR TC4021BP	IC
IC3	HD14021B	IC
	OR TC4021BP	IC
	OR UPD4021BC	IC
IC4	HD14021B	IC
	OR UPD4021BC	IC
	OR TC4021BP	IC
IC5	HD14021B	IC
	OR TC4021BP	IC
	OR UPD4021BC	IC
IC6	TC4066BP	IC
IC7	UPC358C	IC
IC8	HD6803P	IC
IC9	M74LS373P	IC
	OR HD74LS373P	IC
IC10	PGD30007-12	IC
IC11	HD6821P	IC
IC12	M74LS20P	IC
	OR HD74LS20P	IC
IC13	M74LS04P	IC
	OR HD74LS04P	IC
IC14	M74LS08P	IC
	OR HD74LS08P	IC
IC15	M50782SP	IC
IC16	M50782SP	IC
IC17	LM6417E-297	IC
IC18	M54544L	IC
IC19	T062706P	IC
IC20	T062706P	IC
IC21	T062706P	IC
IC22	M54519P	IC
IC23	M54519P	IC
IC24	M54544L	IC
IC25	M54533P	IC
IC26	TC4011BP	IC
Q1	DTC124EF	TRANSISTOR
Q2	DTC124EF	TRANSISTOR
Q4	DTC124EF	TRANSISTOR
Q5	DTC124EF	TRANSISTOR
Q6	DTC124EF	TRANSISTOR
Q7	DTC124EF	TRANSISTOR
Q8	DTC124EF	TRANSISTOR
Q9	DTC124EF	TRANSISTOR
Q10	DTC124EF	TRANSISTOR
Q11	DTC124EF	TRANSISTOR
Q12	DTC124EF	TRANSISTOR
Q13	DTC124EF	TRANSISTOR
Q14	DTC124EF	TRANSISTOR
Q15	DTC124EF	TRANSISTOR
Q16	2SB907	TRANSISTOR
Q17	2SB907	TRANSISTOR
Q18	DTC124EF	TRANSISTOR
D1	1SS133	DIODE
D2	1SS133	DIODE
D3	RD6.2E82	ZENER DIODE

REF NO.	PART NO.	PART NAME, DESCRIPTION
R61	QRD167J-472	RESISTOR
R62	QRD167J-472	RESISTOR
R63	QRD167J-472	RESISTOR
R64	QRD167J-472	RESISTOR
R65	QRD167J-472	RESISTOR
R66	QRD167J-472	RESISTOR
R67	QRD167J-472	RESISTOR
R68	QRD167J-472	RESISTOR
R69	QRD167J-472	RESISTOR
R70	QRD167J-472	RESISTOR
R71	QRD167J-472	RESISTOR
R72	QRD167J-472	RESISTOR
R73	QRD167J-472	RESISTOR
R75	QRD167J-473	RESISTOR
R76	QRD167J-222	RESISTOR
R77	QRD167J-473	RESISTOR
R78	QRD167J-222	RESISTOR
R79	QRD167J-104	RESISTOR
R81	QRD167J-103	RESISTOR
R82	QRD167J-152	RESISTOR
R83	QRD167J-681	RESISTOR
R84	QRD167J-154	RESISTOR
R85	QRD167J-103	RESISTOR
R86	QRD167J-103	RESISTOR
R87	QRD167J-272	RESISTOR
R88	QRD167J-473	RESISTOR
R89	QRD167J-104	RESISTOR
R91	QRD167J-103	RESISTOR
R98	QRD167J-103	RESISTOR
R99	QRD167J-391	RESISTOR
R100	QRD187J-1R0	RESISTOR
R101	QRD187J-1R0	RESISTOR
R102	QRD167J-104	RESISTOR
RA1	EXB-P83104M	RESISTOR ARRAY
RA2	EXB-P86104M	RESISTOR ARRAY
RA3	EXB-P86104M	RESISTOR ARRAY
RA4	EXB-P83103M	NETWORK RESISTOR
RA5	EXB-P83104M	RESISTOR ARRAY
RA6	EXB-P84104M	RESISTOR ARRAY
C1	QET41CM-476	E CAPACITOR
C2	QET41CM-476	E CAPACITOR
C3	QET41CM-107	E CAPACITOR
C4	QET41CM-226	E CAPACITOR
C5	QFN41HK-103	M CAPACITOR
C6	QFN41HK-103	M CAPACITOR
C7	QFN41HK-103	M CAPACITOR
C8	QFN41HK-103	M CAPACITOR
C9	QFN41HK-103	M CAPACITOR
C10	QFN41HK-124	M CAPACITOR
C11	QFN41HK-223	M CAPACITOR
C12	QCS11HJ-220	CAPACITOR
C13	QCS11HJ-220	CAPACITOR
C14	QCF11HP-473	CAPACITOR
C15	QER41HM-225	E CAPACITOR
C16	QCF11HP-473	M CAPACITOR
C17	QET41AM-227	E CAPACITOR
C18	QCF11HP-473	CAPACITOR
C19	QCF11HP-473	CAPACITOR
C20	QFN41HK-103	M CAPACITOR
C21	QCF11HP-473	CAPACITOR
C23	QCS11HJ-101	CAPACITOR
C24	QFN41HK-104	M CAPACITOR
C25	QET41CM-473	E CAPACITOR
C26	QET41CM-106	E CAPACITOR
C27	QFN41HK-103	M CAPACITOR
C28	QFN41HK-154	M CAPACITOR

QA	REF NO.	PART NO.	PART NAME, DESCRIPTION
Q11		25B7455	TRANSISTOR
Q12		25C2647C	TRANSISTOR
Q13		25C2647C	TRANSISTOR
Q14		25B7455	TRANSISTOR
Q15		25C2647C	TRANSISTOR
Q16		25C2647C	TRANSISTOR
Q17		25B7455	TRANSISTOR
D3		ER812-02	DIODE
D4		15S133	DIODE
R1		QVZ3506-222	V RESISTOR
R2		QVZ3506-102	V RESISTOR
R3		QRD167J-101	RESISTOR
R4		QRD167J-822	RESISTOR
R5		QRD167J-472	RESISTOR
R6		QRD167J-222	RESISTOR
R7		QRD167J-223	RESISTOR
R8		QRD167J-223	RESISTOR
R9		QRD167J-822	RESISTOR
R10		QRD167J-472	RESISTOR
R11		QRD167J-3R9	RESISTOR
R12		QRD167J-3R9	RESISTOR
R13		QRD167J-151	RESISTOR
R14		QRD167J-151	RESISTOR
R15		QVZ3506-681	V RESISTOR
R16		QRD167J-273	RESISTOR
R17		QRD167J-471	RESISTOR
R18		QRD167J-223	RESISTOR
R19		QRD167J-822	RESISTOR
R20		QRD167J-682	RESISTOR
R21		QVZ3506-222	V RESISTOR
R22		QRD167J-271	RESISTOR
R23		QRD167J-681	RESISTOR
R24		QRD167J-822	RESISTOR
R25		QRD167J-333	RESISTOR
R26		QRD167J-223	RESISTOR
R27		QRD167J-471	RESISTOR
R28		QVZ3506-681	V RESISTOR
R29		QRD167J-273	RESISTOR
R30		QRD167J-104	RESISTOR
R31		QRD167J-332	RESISTOR
R33		QRD167J-101	RESISTOR
R34		QVZ3506-472	V RESISTOR
R35		QRD167J-103	RESISTOR
R36		QRD167J-103	RESISTOR
R37		QRD167J-681	RESISTOR
R38		QRD167J-472	RESISTOR
R39		QRD167J-222	RESISTOR
R40		QRD167J-682	RESISTOR
R41		QRD167J-103	RESISTOR
R42		QRD167J-222	RESISTOR
R43		QRD167J-221	RESISTOR
R44		QRD167J-561	RESISTOR
R45		QRD167J-561	RESISTOR
R46		QMG019J-221	OMF RESISTOR
R47		QRD167J-103	RESISTOR
R48		QRD167J-152	RESISTOR
R49		QRD167J-182	RESISTOR
R50		QRD167J-391	RESISTOR
R51		QRD167J-561	RESISTOR
R52		QRD167J-152	RESISTOR
R53		QRD167J-561	RESISTOR
R54		QRD167J-102	RESISTOR
R55		QRD167J-681	RESISTOR
R56		QRD167J-102	RESISTOR
R57		QRD167J-563	RESISTOR
R58		QRD167J-223	RESISTOR

REF NO.	PART NO.	PART NAME, DESCRIPTION
IC3	TA7347P	IC
IC4	TA7347P	IC
IC5	10V113	IC
IC6	VC2011	IC
IC7	AN608P	IC
IC8	TA7347P	IC
IC9	HA11703	IC
IC10	UPC1163H	IC
IC11	TA7347P	IC
IC12	MS1454L	IC
Q1	2SC2647C	TRANSISTOR
Q2	2SC2647C	TRANSISTOR
Q3	2SC2647C	TRANSISTOR
Q4	2SC2647C	TRANSISTOR
Q5	2SC2647C	TRANSISTOR
Q6	2SC2647C	TRANSISTOR
Q7	2SC2647C	TRANSISTOR
Q8	2SC2647C	TRANSISTOR
Q9	2SC2647C	TRANSISTOR
Q10	2SC2647C	TRANSISTOR
Q11	2SC2647C	TRANSISTOR
Q12	2SB641Q	TRANSISTOR
Q13	2SC2647C	TRANSISTOR
Q14	2SC2647C	TRANSISTOR
Q15	2SC2647C	TRANSISTOR
Q16	2SB641Q	TRANSISTOR
Q19	2SC2647C	TRANSISTOR
Q20	2SD638R	TRANSISTOR
Q21	2SD638R	TRANSISTOR
Q23	DTA124EF	TRANSISTOR
Q24	2SB643R	TRANSISTOR
Q25	2SD638R	TRANSISTOR
Q26	2SC2647C	TRANSISTOR
Q27	2SC2647C	TRANSISTOR
Q28	2SC2647C	TRANSISTOR
Q29	2SC2647C	TRANSISTOR
Q30	2SC2647C	TRANSISTOR
Q31	2SC2647C	TRANSISTOR
Q32	2SC2647C	TRANSISTOR
Q33	2SC2647C	TRANSISTOR
Q34	2SD638R	TRANSISTOR
Q35	2SC2647C	TRANSISTOR
D1	1SS133	DIODE
D2	1SS99	DIODE
D3	1SS99	DIODE
D4	1SS133	DIODE
D5	1SS133	DIODE
D6	1SS133	DIODE
D7	1SS133	DIODE
D8	1SS133	DIODE
D9	1SS133	DIODE
D10	0A91	DIODE
D11	1SS133	DIODE
D12	1SS133	DIODE
D15	MA27W(A)	DIODE
D16	RD5.3E02	ZENER DIODE
D17	1SS133	DIODE
D18	1SS133	DIODE
D19	1SS133	DIODE
D20	1SS133	DIODE
D21	RD6.8EB1	ZENER DIODE
D22	1SS133	DIODE
D23	1SS133	DIODE
R1	QRD167J-102	RESISTOR
R2	QRD167J-101	RESISTOR

REF NO.	PART NO.	PART NAME, DESCRIPTION
R3	QRD167J-223	RESISTOR
R4	QRD167J-101	RESISTOR
R5	QRD167J-103	RESISTOR
R6	QRD167J-471	RESISTOR
R7	QRD167J-471	RESISTOR
R8	QVZ3506-472	V RESISTOR
R9	QRD167J-123	RESISTOR
R10	QRD167J-562	RESISTOR
R11	QVZ3506-103	V RESISTOR
R12	QRD167J-123	RESISTOR
R13	QRD167J-392	RESISTOR
R14	QRD167J-332	RESISTOR
R15	QRD167J-331	RESISTOR
R16	QRD167J-561	RESISTOR
R17	QRD167J-222	RESISTOR
R18	QRD167J-332	RESISTOR
R19	QRD167J-155	RESISTOR
R20	QRD167J-105	RESISTOR
R21	QRD167J-105	RESISTOR
R22	QVZ3506-473	V RESISTOR
R23	QRD167J-153	RESISTOR
R24	QRD167J-153	RESISTOR
R25	QRD167J-152	RESISTOR
R26	QRD167J-102	RESISTOR
R27	QRD167J-564	RESISTOR
R28	QRD167J-472	RESISTOR
R29	QRD167J-152	RESISTOR
R30	QRD167J-122	RESISTOR
R31	QRD167J-561	RESISTOR
R32	QVZ3506-104	V RESISTOR
R33	QRD167J-103	RESISTOR
R34	QRD167J-121	RESISTOR
R35	QRD167J-332	RESISTOR
R36	QRD167J-101	RESISTOR
R37	QRD167J-102	RESISTOR
R38	QRD167J-223	RESISTOR
R39	QVZ3506-102	V RESISTOR
R40	QRD167J-102	RESISTOR
R41	QRD167J-391	RESISTOR
R42	QRD167J-391	RESISTOR
R43	QRD167J-222	RESISTOR
R44	QRD167J-222	RESISTOR
R45	QRD167J-471	RESISTOR
R46	QRD167J-471	RESISTOR
R47	QVZ3506-222	V RESISTOR
R48	QVZ3506-222	V RESISTOR
R49	QRD167J-223	RESISTOR
R50	QRD167J-101	RESISTOR
R51	QRD167J-102	RESISTOR
R52	QRD167J-102	RESISTOR
R53	QRD167J-821	RESISTOR
R54	QRD167J-751	RESISTOR
R55	QRD167J-223	RESISTOR
R56	QRD167J-563	RESISTOR
R57	QRD167J-561	RESISTOR
R58	QRV163F-1620	CMF RESISTOR
R59	QRD167J-103	RESISTOR
R60	QRD167J-181	RESISTOR
R61	QRD167J-222	RESISTOR
R62	QRD167J-682	RESISTOR
R63	QRD167J-182	RESISTOR
R64	QRD167J-392	RESISTOR
R65	QRD167J-101	RESISTOR
R66	QRD167J-223	RESISTOR
R67	QVZ3506-222	V RESISTOR
R68	QVZ3506-222	V RESISTOR
R69	QRD167J-471	RESISTOR
R70	QRD167J-221	RESISTOR

REF NO.	PART NO.	PART NAME, DESCRIPTION
R71	QRD167J-222	RESISTOR
R72	QRD167J-471	RESISTOR
R73	QRD167J-222	RESISTOR
R74	QRD167J-391	RESISTOR
R75	QRD167J-391	RESISTOR
R76	QRD167J-102	RESISTOR
R77	QRD167J-272	RESISTOR
R78	QRD167J-561	RESISTOR
R79	QRD167J-561	RESISTOR
R80	QRD167J-562	RESISTOR
R81	QRD167J-122	RESISTOR
R82	QRD167J-122	RESISTOR
R83	QRD167J-123	RESISTOR
R84	QRD167J-102	RESISTOR
R85	QVZ3506-102	V RESISTOR
R86	QRD167J-332	POSISTOR
R87	PUS2108-688K	POSISTOR
R88	QRD167J-332	RESISTOR
R89	QRD167J-563	RESISTOR
R90	QRD167J-333	RESISTOR
R91	QRD167J-184	RESISTOR
R92	QRD167J-103	RESISTOR
R93	QVZ3506-472	V RESISTOR
R94	QRD167J-562	RESISTOR
R95	QRD167J-487	RESISTOR
R96	QRD167J-487	RESISTOR
R97	QRD167J-102	RESISTOR
R98	QRD167J-562	RESISTOR
R99	QRD167J-682	RESISTOR
R104	QRD167J-223	RESISTOR
R105	QRD129J-821	OHF RESISTOR
R106	QRD167J-330	RESISTOR
R107	QRD167J-222	RESISTOR
R108	QRD167J-123	RESISTOR
R109	QRD167J-750	RESISTOR
R111	QRD167J-102	RESISTOR
R116	QRD167J-103	RESISTOR
R117	QRD167J-103	RESISTOR
R118	QRD167J-103	RESISTOR
R119	QRD167J-103	RESISTOR
R120	QRD167J-334	RESISTOR
R121	QRD167J-392	RESISTOR
R122	QRD167J-331	RESISTOR
R123	QRD167J-222	RESISTOR
R126	QRD167J-333	RESISTOR
R127	QRD167J-223	RESISTOR
R128	QRD167J-671	RESISTOR
R129	QRD167J-331	RESISTOR
R130	QRD167J-331	RESISTOR
R131	QRD167J-563	RESISTOR
R132	QRD167J-223	RESISTOR
R133	QVZ3506-471	V RESISTOR
R136	QVZ3506-471	V RESISTOR
R136	QRD167J-222	RESISTOR
R136	QRD167J-222	RESISTOR
R137	QRD167J-391	RESISTOR
R138	QRD167J-681	RESISTOR
R139	QRD167J-272	RESISTOR
R140	QRD167J-391	RESISTOR
R141	QRD167J-561	RESISTOR
R142	QRD167J-392	RESISTOR
R143	QRD167J-391	RESISTOR
R144	QRD167J-391	RESISTOR
R145	QRD167J-272	RESISTOR
R146	QRD167J-223	RESISTOR
R147	QRD167J-103	RESISTOR

REF NO.	PART NO.	PART NAME, DESCRIPTION
R148	QRD167J-101	RESISTOR
R149	QVZ3506-682	V RESISTOR
R150	QVZ3506-103	V RESISTOR
R151	QRD167J-221	RESISTOR
R152	QRD167J-103	RESISTOR
R153	QRD167J-223	RESISTOR
R154	QRD167J-223	RESISTOR
R155	QRD167J-103	RESISTOR
R156	QRD167J-103	RESISTOR
R157	QRD167J-680	RESISTOR
R158	QRD167J-222	RESISTOR
R159	QRD167J-560	RESISTOR
R160	QRD167J-103	RESISTOR
R161	QRD167J-102	RESISTOR
R162	QRD167J-102	RESISTOR
R163	QRD167J-220	RESISTOR
R169	PUS2108-688K	POSISTOR
R170	QRD167J-101	RESISTOR
C1	QET61CM-476	E CAPACITOR
C2	QET61CM-476	E CAPACITOR
C3	QEU41CM-107	E CAPACITOR
C4	QCF31HP-473	CAPACITOR
C5	QET61CM-476	E CAPACITOR
C6	QET61CM-476	E CAPACITOR
C7	QCF31HP-223	CAPACITOR
C8	QET61CM-107	E CAPACITOR
C9	QCS31HJ-270	CAPACITOR
C10	QCF31HP-223	CAPACITOR
C11	QET61CM-107	E CAPACITOR
C12	QCF31HP-223	CAPACITOR
C13	QCS31HJ-680	CAPACITOR
C14	QAT3001-017	TRIMMER CAPACITOR
C15	QCF31HP-223	CAPACITOR
C16	QCS31HJ-330	CAPACITOR
C17	PUS1163-471	CAPACITOR
C18	QCF31HP-223	CAPACITOR
C19	QET61HM-474	E CAPACITOR
C20	QFN31HK-473	M CAPACITOR
C21	QET61CM-336	E CAPACITOR
C22	QCF31HP-223	CAPACITOR
C23	QET61CM-107	E CAPACITOR
C24	QFN31HK-563	M CAPACITOR
C25	QEN40JM-477	NP E CAPACITOR
C26	QET61HM-335	E CAPACITOR
C27	QET61CM-476	E CAPACITOR
C28	QCS31HJ-151	CAPACITOR
C29	QET61CM-476	E CAPACITOR
C30	QCF31HP-223	CAPACITOR
C31	QET61CM-476	E CAPACITOR
C32	QET61CM-107	E CAPACITOR
C33	QCF31HP-223	CAPACITOR
C34	QET61AM-227	E CAPACITOR
C35	QET61CM-107	E CAPACITOR
C36	QCF31HP-223	CAPACITOR
C37	QCF31HP-223	CAPACITOR
C38	QCF31HP-223	CAPACITOR
C39	QET61CM-476	E CAPACITOR
C40	QET61CM-107	E CAPACITOR
C41	QET61CM-476	E CAPACITOR
C42	QET61CM-476	E CAPACITOR
C43	QCF31HP-223	CAPACITOR
C44	QET61CM-107	E CAPACITOR
C45	QCF31HP-223	CAPACITOR
C46	QCS31HJ-121	CAPACITOR
C47	QCS31HJ-121	CAPACITOR
C48	QCS31HJ-561	CAPACITOR
C49	QFN31HK-103	M CAPACITOR

QΔ REF NO.	PART NO.	PART NAME, DESCRIPTION
C50	QFN31HK-103	M CAPACITOR
C51	QET61CM-476	E CAPACITOR
C52	QCF31HP-223	CAPACITOR
C53	QFN31HK-103	M CAPACITOR
C54	QCF31HP-223	CAPACITOR
C55	QET61HM-105	E CAPACITOR
C56	QCS31HJ-331	CAPACITOR
C57	QET61HM-105	E CAPACITOR
C58	QCF31HP-223	CAPACITOR
C59	QET61CM-476	E CAPACITOR
C60	QCF31HP-223	CAPACITOR
C61	QET61CM-476	E CAPACITOR
C62	QET61CM-476	E CAPACITOR
C63	QCF31HP-223	CAPACITOR
C64	QET61CM-107	E CAPACITOR
C65	QCF31HP-223	CAPACITOR
C66	QET61CM-107	E CAPACITOR
C67	QCS31HJ-221	CAPACITOR
C68	QCS31HJ-390	CAPACITOR
C69	QET61CM-476	E CAPACITOR
C70	QCF31HP-223	CAPACITOR
C71	QET61CM-107	E CAPACITOR
C72	QCF31HP-223	CAPACITOR
C73	QET61CM-476	E CAPACITOR
C74	QET61CM-476	E CAPACITOR
C75	QCF31HP-223	CAPACITOR
C76	QCF31HP-223	CAPACITOR
C77	QET61CM-107	E CAPACITOR
C78	QCF31HP-223	CAPACITOR
C79	QCS31HJ-101	CAPACITOR
C80	QET61CM-476	E CAPACITOR
C81	QET61CM-336	E CAPACITOR
C82	QET61CM-107	E CAPACITOR
C83	QCF31HP-223	CAPACITOR
C84	PUS1163-391	CAPACITOR
C85	QCS31HJ-470	CAPACITOR
C86	QEN61CM-476	NP E CAPACITOR
C87	QET61HM-105	E CAPACITOR
C88	QCS31HJ-180	CAPACITOR
C89	QET61HM-105	E CAPACITOR
C90	QCS31HJ-121	CAPACITOR
C91	QCS31HJ-121	CAPACITOR
C92	QCS31HJ-180	CAPACITOR
C93	QET61CM-476	E CAPACITOR
C94	QET61CM-476	E CAPACITOR
C95	QET61CM-476	E CAPACITOR
C96	QFN31HK-103	M CAPACITOR
C97	QFN31HK-103	M CAPACITOR
C98	QCF31HP-223	CAPACITOR
C99	QCF31HP-223	CAPACITOR
C100	QET61CM-227	E CAPACITOR
C101	QET61CM-476	E CAPACITOR
C102	QET61CM-476	E CAPACITOR
C103	QCF31HP-223	CAPACITOR
C104	QET61CM-107	E CAPACITOR
C105	QET61HM-105	E CAPACITOR
C106	QET61HM-106	E CAPACITOR
C107	QET61HM-106	E CAPACITOR
C108	QCF31HP-223	CAPACITOR
C109	QET61CM-107	E CAPACITOR
C110	QCS31HJ-350	CAPACITOR
C111	QET61CM-476	E CAPACITOR
C112	QCF31HP-223	CAPACITOR
C113	QET61CM-107	E CAPACITOR
C114	QET60JM-228	E CAPACITOR
C115	QCF31HP-223	CAPACITOR
C116	QCF31HP-223	CAPACITOR

QΔ REF NO.	PART NO.	PART NAME, DESCRIPTION
C117	QCF31HP-223	CAPACITOR
C118	QEU41CM-107	E CAPACITOR
C119	QEU41CM-476	E CAPACITOR
C120	QFN31HK-223	M CAPACITOR
C121	QFN31HK-223	M CAPACITOR
C122	QET61CM-106	E CAPACITOR
C123	QEU41CM-476	E CAPACITOR
C124	QCF31HP-223	CAPACITOR
C125	QET61CM-107	E CAPACITOR
C126	QCF31HP-223	CAPACITOR
C127	QET61CM-476	E CAPACITOR
C128	QET61CM-476	E CAPACITOR
C129	QCS31HJ-271	CAPACITOR
C130	QET61CM-476	E CAPACITOR
C131	QET61CM-476	E CAPACITOR
C132	QCF31HP-223	CAPACITOR
C133	QCS31HJ-221	CAPACITOR
C134	QET61CM-476	E CAPACITOR
C135	QFN31HK-103	M CAPACITOR
C136	QCS31HJ-820	CAPACITOR
C137	PUS1163-331	CAPACITOR
C138	QET61CM-107	E CAPACITOR
C139	QCF31HP-223	CAPACITOR
C140	QFN41HK-103	M CAPACITOR
C141	QCS31HJ-820	CAPACITOR
C142	QCF31HP-223	CAPACITOR
C143	QET61CM-107	E CAPACITOR
C144	QCF31HP-223	CAPACITOR
C145	QET61CM-107	E CAPACITOR
C146	QET61CM-476	E CAPACITOR
C147	QET61HM-225	E CAPACITOR
C148	QEK41HM-334	E CAPACITOR
C149	QCF31HP-223	CAPACITOR
C150	QCF31HP-223	CAPACITOR
C151	QCF31HP-223	CAPACITOR
C152	QCF31HP-223	CAPACITOR
C153	QET61CM-476	E CAPACITOR
C154	QET61CM-476	E CAPACITOR
C155	QET61CM-476	E CAPACITOR
C156	QET61CM-476	E CAPACITOR
C157	QET61HM-475	E CAPACITOR
C158	QCF31HP-223	CAPACITOR
C159	QCF31HP-223	CAPACITOR
C160	QFN31HK-103	M CAPACITOR
C161	QCS31HJ-560	CAPACITOR
C162	QCS31HJ-820	CAPACITOR
C163	QCS31HJ-820	CAPACITOR
C164	QET61CM-476	E CAPACITOR
C165	QCS31HJ-270	CAPACITOR
Δ L1	PU48530-221K	PEAKING COIL
Δ L2	PU48530-221K	PEAKING COIL
Δ L3	PU48530-820K	PEAKING COIL
Δ L4	PU48530-221K	PEAKING COIL
Δ L5	PU48530-120K	PEAKING COIL
Δ L6	PU48530-221K	PEAKING COIL
Δ L7	PU48530-221K	PEAKING COIL
Δ L8	PU48530-221K	PEAKING COIL
Δ L9	PU48530-680K	PEAKING COIL
Δ L10	PU48530-221K	PEAKING COIL
Δ L11	PU48530-221K	PEAKING COIL
Δ L12	PU48530-221K	PEAKING COIL
Δ L13	PU48530-221K	PEAKING COIL
Δ L14	PU48530-221K	PEAKING COIL
Δ L15	PU48530-220K	PEAKING COIL
Δ L16	PU48530-221K	PEAKING COIL
Δ L17	PU48530-221K	PEAKING COIL
Δ L18	PU48530-221K	PEAKING COIL
Δ L19	PU48530-221K	PEAKING COIL

QΔ REF NO.	PART NO.	PART NAME, DESCRIPTION
Δ L20	PU48530-221K	PEAKING COIL
Δ L21	PU48530-221K	PEAKING COIL
Δ L22	PU48530-221K	PEAKING COIL
Δ L23	PU48530-330K	PEAKING COIL
Δ L24	PU48530-221K	PEAKING COIL
Δ L25	PU48530-221K	PEAKING COIL
Δ L26	PU48530-221K	PEAKING COIL
Δ L27	PU48530-221K	PEAKING COIL
Δ L28	PU48530-221K	PEAKING COIL
Δ L29	PU48530-8R2K	PEAKING COIL
CT1	PU46042-6	C TRAP
EQ1	PU54129	LOW PASS FILTER
EQ2	PU50748	EQUALIZER
EQ3	PU54129	LOW PASS FILTER
EQ5	PG200158	EQUALIZER
LPF1	PU54128	LOW PASS FILTER
LPF2	PU54064	LOW PASS FILTER
LPF3	PU54128-2	LOW PASS FILTER
LPF4	PU54064	LOW PASS FILTER
LPF5	PU54128	LOW PASS FILTER
LPF6	PU30192-7D	LOW PASS FILTER
RY1	PG200430	RELAY
TH1	ERT-D2FHK-202S	THERMISTOR
TP1	PU57545	TEST PIN(TP1-9)
CN1	PU43351-2R	CAP HOUSING
CN2	PU43351-2Y	CAP HOUSING
CN3	PU43351-4	CAP HOUSING
CN4	PU43351-3R	CAP HOUSING
CN5	PU43351-2R	CAP HOUSING
CN6	PU43351-5	CAP HOUSING
CN7	PU43351-3	CAP HOUSING
CN8	PU43351-5	CAP HOUSING
CN9	PU43351-3	CAP HOUSING
CN10	PU43351-4	CAP HOUSING
CN11	PU43351-2	CAP HOUSING
CN12	PU43351-4Y	CAP HOUSING
CN13	PU43351-3Y	CAP HOUSING
CN14	PU43351-4Y	CAP HOUSING
CN15	PU43351-4R	CAP HOUSING
CN16	PU43351-2Y	CAP HOUSING
-FM DELAY BOARD ASSEMBLY-		
Q36	ZSC2647C	TRANSISTOR
R164	QRD167J-102	RESISTOR
R165	QRD167J-332	RESISTOR
R166	QRD167J-333	RESISTOR
R167	QRD167J-102	RESISTOR
R168	QRD167J-151	RESISTOR
C166	QFN41HK-103	M CAPACITOR
C167	QFN41HK-103	M CAPACITOR
C168	QFN41HK-103	M CAPACITOR
C169	QET61CM-476	E CAPACITOR
C170	QCF31HP-223	CAPACITOR
L30	PU48530-221K	PEAKING COIL
EQ6	PG200148	EQUALIZER

QΔ REF NO.	PART NO.	PART NAME, DESCRIPTION

" 6.2.12 OPERATION CIRCUIT BOARD ASSEMBLY <12> "		

PWB8	PGE30011A	OPERATION PWB ASSY
D1	GL-3PR2	LE DIODE
D2	GL-3PR2	LE DIODE
D3	GL-3PR2	LE DIODE
D4	GL-3PR2	LE DIODE
D5	GL-3PR2	LE DIODE
D6	GL-3PR2	LE DIODE
R1	QRD182J-331	RESISTOR
R2	QRD182J-331	RESISTOR
R3	QRD182J-331	RESISTOR
R4	QRD182J-331	RESISTOR
R5	QRD182J-331	RESISTOR
R6	QRD182J-331	RESISTOR
S1	PU49364	PUSH SWITCH
S2	PU49364	PUSH SWITCH
S3	PU49364	PUSH SWITCH
S4	PU49364	PUSH SWITCH
S5	PU49364	PUSH SWITCH
S6	PU49364	PUSH SWITCH
S7	PU49364	PUSH SWITCH
SPC1	PU52848-1-2	LED SPACER
CN1	PU49215-109Y	CAP HOUSING
CN2	PU49215-109	CAP HOUSING
CN3	PU49215-109R	CAP HOUSING
CN4	PU49215-102R	CAP HOUSING
CN5	PU49215-102	CAP HOUSING
CN6	PU49215-108	CAP HOUSING
CN7	PU49215-102	CAP HOUSING
CN8	PU49215-102R	CAP HOUSING
CN9	PU49215-102Y	CAP HOUSING
LP1	PU56008	TEST-PIN

" 6.2.13 END SENSOR CIRCUIT BOARD <13> "		

PWB8	PGE40151	END SENSOR PWB
PT1	PT-352V	PHOTO TRANSISTOR
Δ VA1	PU49624-2	VARISTOR
Δ VA2	PU49624-2	VARISTOR

" 6.2.14 L.E.D CIRCUIT BOARD <15> "		

Δ PWB8	PU55110	LED PWB
D1	GL-450V	LE DIODE
HO1	PQ30101A	LED HOLDER

Q/A	REF NO.	PART NO.	PART NAME, DESCRIPTION
C31	QET61CM-107	E CAPACITOR	
C32	QFN31HK-103	M CAPACITOR	
C33	QFN31HK-122	M CAPACITOR	
C34	QFN31HK-273	M CAPACITOR	
C35	QCF11HP-103	E CAPACITOR	
C36	QET61EM-107	E CAPACITOR	
C37	QCS31HJ-580	E CAPACITOR	
C38	QET61EM-107	E CAPACITOR	
C40	QET61EM-477	E CAPACITOR	
C41	QCF11HP-223	E CAPACITOR	
C42	QET61CM-106	E CAPACITOR	
C43	QET61CM-106	E CAPACITOR	
C51	QFN31HK-273	M CAPACITOR	
C52	QCF11HP-103	E CAPACITOR	
C53	QET61EM-107	E CAPACITOR	
C55	QET61EM-107	E CAPACITOR	
C56	QCF11HP-223	E CAPACITOR	
C57	QET61EM-477	E CAPACITOR	
C58	QCF31HP-223	E CAPACITOR	
C59	QET61CM-106	E CAPACITOR	
C75	QET61CM-107	E CAPACITOR	
C76	QCF31HP-103	E CAPACITOR	
C77	QET61CM-106	E CAPACITOR	
C78	QET61CM-106	E CAPACITOR	
C79	QET61CM-106	E CAPACITOR	
C80	QET61CM-227	E CAPACITOR	
C81	QCF11HP-223	E CAPACITOR	
C82	QET61EM-227	E CAPACITOR	
C83	QCF11HP-223	E CAPACITOR	
C84	QET61EM-106	E CAPACITOR	
C85	QET61EM-106	E CAPACITOR	
C88	QET61CM-107	E CAPACITOR	
C92	QFN41HK-102	M CAPACITOR	
C93	QFN41HK-102	M CAPACITOR	
C97	QET61CM-107	E CAPACITOR	
C98	QCF31HP-103	E CAPACITOR	
C99	QFN31HJ-103	M CAPACITOR	
C100	QET61CM-106	E CAPACITOR	
C101	QCF31HP-103	E CAPACITOR	
C102	QET61EM-476	E CAPACITOR	
C103	QFN31HJ-273	M CAPACITOR	
C104	QFN31HK-104	M CAPACITOR	
C105	QFN41HJ-332	M CAPACITOR	

Δ L1	PU48530-271K	PEAKING COIL	
Δ L4	PU48530-271K	PEAKING COIL	
Δ L5	PU50755	CHOKE COIL	
Δ L6	PU48530-271K	PEAKING COIL	
Δ L9	PU50755	CHOKE COIL	
Δ L13	PU48530-271K	PEAKING COIL	
Δ L14	PU48530-271K	PEAKING COIL	
Δ L15	PU50277	INDUCTOR	
Δ L16	PU48530-271K	PEAKING COIL	
Δ L17	PU48530-271K	PEAKING COIL	
HS1	PU33644	S HEAT SINK (1)	
HS2	PU50718	S HEAT SINK (2)	
SCW1	PU41624-6	ISOLAT. WASHER, X2	
SCW2	GBST3006Z	TH.TAP. SCREW	
SCW3	GBST3008Z	ASSY SCREW, X2	
SLD1	PU33642	SHIELD CASE	

Q/A	REF NO.	PART NO.	PART NAME, DESCRIPTION
J201	PU50715-6	FEMALE CONN	
J202	PU50715-18	FEMALE CONN	
J203	PU50715-16	FEMALE CONN	
TP1	PU45908	TEST PIN, (4-7, 9-21)	
CN100	PU45375	TR.SPACER, X2	
CN110	PU32908	SERVO PWB STAY	

***** 8.2.19 D/C SERVO CIRCUIT BOARD ASSEMBLY <21> *****			

PWBA	PGE201908-02	D/C SERVO ASS'Y	
IC1	M51490L	IC	
IC2	M51796P	IC	
IC3	UPC324C	IC	
IC4	VC2023A-1	IC	
IC5	TC40308P	IC	
IC6	TC40248P	IC	
IC7	M546448L	IC	
IC9	VC2025	IC	
IC10	TA78005AP	IC	
Q1	DTC144EF	TRANSISTOR	
Q2	2SC1740S(QRS)	TRANSISTOR	
Q3	2SA933S(RS)	TRANSISTOR	
Q4	2SC1740S(QRS)	TRANSISTOR	
Q5	2SA933S(RS)	TRANSISTOR	
Q6	DTC114EF	TRANSISTOR	
Q7	DTC114EF	TRANSISTOR	
Q8	DTC144EF	TRANSISTOR	
Q9	2SD973AR	TRANSISTOR	
Q10	DTC144EF	TRANSISTOR	
Q11	DTC144EF	TRANSISTOR	
Q12	DTC144EF	TRANSISTOR	
Q13	DTC144EF	TRANSISTOR	
Q14	DTC144EF	TRANSISTOR	
Q15	DTC144EF	TRANSISTOR	
Q16	DTA144EF	TRANSISTOR	
D1	1SS133	DIODE	
D2	1SS133	DIODE	
D4	1SS133	DIODE	
D5	1SS133	DIODE	
D7	1SS133	DIODE	
D8	HZ55.6EB1	ZENER DIODE	
R1	QRD161J-152	RESISTOR	
R2	QRD161J-224	RESISTOR	
R3	QRD161J-104	RESISTOR	
R4	QRD161J-102	RESISTOR	
R5	QRD161J-331	RESISTOR	
R6	QRD161J-684	RESISTOR	
R7	QRD161J-102	RESISTOR	
R8	QRD161J-103	RESISTOR	
R9	QRD161J-564	RESISTOR	
R10	QRD161J-103	RESISTOR	
R11	QRD161J-105	RESISTOR	
R12	QRD161J-103	RESISTOR	
R13	QRD161J-103	RESISTOR	
R14	QRD161J-103	RESISTOR	
R15	QRD161J-153	RESISTOR	
R16	QRD161J-105	RESISTOR	
R17	QRD161J-102	RESISTOR	
R18	QRD161J-104	RESISTOR	
R19	QRD161J-105	RESISTOR	

Q/A	REF NO.	PART NO.	PART NAME, DESCRIPTION
R20	QRD161J-221	RESISTOR	
R21	QRD161J-333	RESISTOR	
R22	QRD161J-223	RESISTOR	
R24	QRD161J-105	RESISTOR	
R25	QRD161J-105	RESISTOR	
R26	QRD161J-393	RESISTOR	
R27	QRD161J-330	RESISTOR	
R28	QRD161J-473	RESISTOR	
R29	QRD161J-473	RESISTOR	
R30	QRD161J-473	RESISTOR	
R31	QRD161J-473	RESISTOR	
R32	QRD161J-473	RESISTOR	
R33	QRD161J-473	RESISTOR	
R34	QRD161J-564	RESISTOR	
R35	QRD161J-105	RESISTOR	
R36	QRD161J-683	RESISTOR	
R37	QRD161J-473	RESISTOR	
R38	QRD161J-473	RESISTOR	
R40	QRD161J-333	RESISTOR	
R41	PU55509-474	V RESISTOR	
R42	QRD161J-223	RESISTOR	
R43	PU55509-224	V RESISTOR	
R44	QRD161J-562	RESISTOR	
R45	QRD161J-104	RESISTOR	
R46	QRD161J-473	RESISTOR	
R48	QRD161J-103	RESISTOR	
R50	QRD161J-103	RESISTOR	
R51	QRD161J-272	RESISTOR	
R52	QRD161J-102	RESISTOR	
R53	QRD161J-103	RESISTOR	
R54	QRD161J-333	RESISTOR	
R55	QRD161J-472	RESISTOR	
R56	QRD161J-104	RESISTOR	
R57	QRD161J-104	RESISTOR	
R58	QRD161J-105	RESISTOR	
R59	QRD161J-104	RESISTOR	
R60	QRD161J-104	RESISTOR	
R61	QRD161J-564	RESISTOR	
R62	QRD161J-472	RESISTOR	
R63	QRD161J-121	RESISTOR	
R64	QRD161J-121	RESISTOR	
R65	QRD161J-121	RESISTOR	
R66	QRD161J-121	RESISTOR	
R67	QRD161J-121	RESISTOR	
R69	QRD161J-681	RESISTOR	
R70	QRD161J-224	RESISTOR	
R71	QRD161J-473	RESISTOR	
R72	QRD161J-103	RESISTOR	
R74	QRD161J-224	RESISTOR	
R75	QRD161J-823	RESISTOR	
R76	QRD161J-563	RESISTOR	
R77	QRD161J-224	RESISTOR	
R78	QRD161J-473	RESISTOR	
R79	QRD161J-103	RESISTOR	
R80	QRD161J-103	RESISTOR	
C1	QET61CM-476	E CAPACITOR	
C2	QCS31HJ-151	CAPACITOR	
C3	QCF31HP-103	CAPACITOR	
C4	QFN31HK-103	M CAPACITOR	
C5	QET61CM-227	E CAPACITOR	
C6	QET61CM-106	E CAPACITOR	
C7	QET61CM-106	E CAPACITOR	
C8	QET61CM-106	E CAPACITOR	
C9	QET61CM-476	E CAPACITOR	
C10	QFN31HK-104	M CAPACITOR	
C11	QFN31HJ-332	M CAPACITOR	

Q/A	REF NO.	PART NO.	PART NAME, DESCRIPTION
C12	QET61EM-475	E CAPACITOR	
C13	QCS31HJ-101	CAPACITOR	
C14	QFN31HK-102	M CAPACITOR	
C15	QET61CM-106	E CAPACITOR	
C16	QET61CM-225	E CAPACITOR	
C17	QCF31HP-103	E CAPACITOR	
C18	QEN61HM-105	NP E CAPACITOR	
C19	QCF31HP-102	CAPACITOR	
C20	QFN31HK-273	M CAPACITOR	
C21	QEN61HM-474	E CAPACITOR	
C22	QET61CM-476	E CAPACITOR	
C23	QCF31HP-223	CAPACITOR	
C24	QET61CM-106	E CAPACITOR	
C25	QET61CM-104	E CAPACITOR	
C26	QCS31HJ-330	CAPACITOR	
C27	QCS31HJ-330	CAPACITOR	
C28	QFN31HK-223	M CAPACITOR	
C29	QCS31HJ-472	CAPACITOR	
C30	QFN31HJ-473	M CAPACITOR	
C31	QCS31HJ-472	CAPACITOR	
C32	QFN31HK-473	M CAPACITOR	
C35	QFN31HK-473	M CAPACITOR	
C36	QFN31HK-473	M CAPACITOR	
C37	QCS31HJ-472	CAPACITOR	
C38	QCS31HJ-472	CAPACITOR	
C39	QET61EM-475	E CAPACITOR	
C40	QET61EM-475	E CAPACITOR	
C41	QFN31HJ-102	M CAPACITOR	
C42	QFN41HJ-682M	M CAPACITOR	
C43	QFN41HJ-683M	M CAPACITOR	
C44	QCF31HP-223	CAPACITOR	
C45	QET61CM-476	E CAPACITOR	
C46	QFN31HK-152	M CAPACITOR	
C47	QET61CM-476	E CAPACITOR	
C48	QET61CM-476	E CAPACITOR	
C49	QCF31HP-223	CAPACITOR	
C50	QCF31HP-102	CAPACITOR	
C51	QFN31HK-223	M CAPACITOR	
C52	QCS31HJ-271	CAPACITOR	
C53	QFN41HJ-472M	M CAPACITOR	
C54	QFN31HK-102	M CAPACITOR	
C55	QFN31HK-103	M CAPACITOR	
C56	QCS31HJ-221	CAPACITOR	
C57	QFN31HK-102	M CAPACITOR	
C58	QFN31HK-104	M CAPACITOR	
C59	QFN31HK-104	M CAPACITOR	
C60	QFN31HK-473	M CAPACITOR	
C61	QFN31HK-473	M CAPACITOR	
C62	QFN31HK-473	M CAPACITOR	
C63	QCF31HP-223	CAPACITOR	
C64	QET61CM-476	E CAPACITOR	
C65	QEN61EM-475	NP E CAPACITOR	
C66	QCF31HP-102	CAPACITOR	
C67	QET61CM-476	E CAPACITOR	
C68	QCF31HP-223	CAPACITOR	
C69	QET61AM-107	E CAPACITOR	
C70	QET61CM-476	E CAPACITOR	
C71	QET61HM-105	E CAPACITOR	
C72	QET61HM-105	E CAPACITOR	
C74	QFN31HK-104	M CAPACITOR	
C75	QET61CM-104	E CAPACITOR	
C76	QCS31HJ-101	CAPACITOR	
L1	PU48530-271J	PEAKING COIL	
L2	PU48530-271J	PEAKING COIL	
L3	PU48530-271J	PEAKING COIL	
L4	PU48530-271J	PEAKING COIL	

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*      6.2.20 MOTHER CIRCUIT BOARD ASSEMBLY <23>      *
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6.2.21 FRONT LED CIRCUIT BOARD ASSEMBLY <24>

其委託書內容如下：

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N  6.2.23  TERMINAL CIRCUIT BOARD <26>  N
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*****
M  6.2.24 AUDIOLIMITER SWITCH CIRCUIT BOARD <31>
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*****
* 6.2.25 A/C HEAD CIRCUIT BOARD <35>
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*****
* 6.2.28 POWER TR CIRCUIT. BOARD <41>
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h PWBA	PGE40034	P. TR PWB
R1	QRD167J-222	RESISTOR
C1	QET41EM-227	E CAPACITOR